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EDITORIAL COMMENT.

ONSIDERING the wanton misuse of aircraft of which Germany was guilty during the War, and the crimes of which she was the perpetrator, the air clauses of the Peace Treaty do not, to our way of thinking, err on the side of undue severity. Germany is not to be allowed to create or maintain any naval or military air forces. She is, however, to be allowed to maintain a maximum number of 100 unarmed seaplanes up to October 1 next, to be exclusively employed in searching for submarine mines. The entire *personnel* of the air forces in Germany is to be demobilised within two months, except for a total of 1,000 officers and men which may be retained up to October. The aircraft of the Allied and Associated Powers are to enjoy full liberty of passage and landing over and in the territory and territorial

The Air Clauses of the Peace Treaty

waters of Germany until January 1, 1923, unless prior to that date Germany is admitted to the League of Nations or is permitted to adhere to the International Air Convention. The manufacture of aircraft and aircraft parts is forbidden throughout Germany for a period of six months. All military and naval aircraft, including dirigibles and aeronautical material, are to be delivered to the Allied and Associated Governments within three months, with the exception of the 100 seaplanes already mentioned.

Such is the outline of the terms to be exacted from a beaten Germany. It means that Germany which once prided herself on being the leading nation in aerial matters, and with considerable justification, disappears from the list of aerial Powers. Her Zeppelins, which were to beat the Allied nations to their knees by the complete destruction of their capitals and their most important cities, are now to be ignominiously handed over to the enemy. She is not to be allowed to maintain even the nucleus of an air force lest she should take heart again and endeavour by sudden aerial attack to compass what she has failed to do in the world War. She is tacitly informed that so little is she to be trusted that she is not even to be allowed to build for herself aircraft for commercial use until, after the lapse of six months, the Allies have had time to co-ordinate their plans and obtain a lead that will put it out of the question for Germany to overtake her leeway for years to come, unless we are foolish enough to rest on oars and allow her to make up on us. We cannot think so ill of our own people as to believe that anything of the kind is likely to happen, but it is just as well to recognise at once that Germany is fully aware of the future possibilities of commercial aviation and that, once the period of probation is over, she will strain every nerve to establish herself among the leaders. Therefore, we shall do well to make use of the six months' interval to set things going in real earnest. If we do that, we have no need to fear the future competition of Germany. We are ahead of her technically and in facilities for production so far as aeroplanes are concerned. As to the airship, in the construction and design of the smaller non-rigid craft we have nothing to learn from Germany. Indeed, we could teach the Germans a good deal about them. Only in the construction of the large rigid airships is Germany at all

ahead of us, and even here the lead is not serious, and by the surrender to the Allies of all ships of the type we shall learn the few details we are still seeking. It is clear, then, that if we are only true to ourselves we can afford to regard the possibility of German competition with equanimity, though not by any means with contempt. It will be a long time before Germany can again become dangerous in the air, either commercially or for purposes of aggression. Indeed, as to the latter nothing short of a serious split between the Allies—which is unthinkable—can ever again give to Germany the opportunity of becoming an aggressor.

* * *

**The
Individual
Criminals**

If we are not completely misinformed, there is a very pretty little controversy going on in Paris as to what is to be done about the German airmen concerned in the bombing of British and Allied towns and the killing of civilian men, women and children, incidental to the enemy's policy of "frightfulness."

Apparently, the civilian representatives, particularly the lawyer element, are in favour of demanding these men from Germany in order that they may be tried as criminals. The soldiers and sailors, on the other hand, take the view that these airmen were soldiers acting under the orders of their superiors, and were compelled, whether they liked it or not, to obey their instructions and to carry out raids as directed.

We must say that on consideration we are very much inclined to take the latter view. It may be quite likely that most of the Hun airmen who raided London, for example, did so with as much pleasure as was to be got out of a vastly dangerous enterprise of war. Doubtless, every Hun of them felt thrilled with pleasure when he saw his bombs bursting in the streets below, and thought of the loss of innocent human life he has caused. But we do not think the precise degree of satisfaction experienced by the individual raider has anything to do with the case. We were fighting a nation of brutes and blackguards who severally regarded these matters from a different point of view from that taken up by ourselves or the French. When we definitely adopted the policy of reprisals, we know that it was extremely distasteful to our own airmen to be compelled to bomb the Rhineland cities. At the best they regarded it as an unpleasant duty, but nevertheless a duty that had to be carried out. They were soldiers and as such it was no business of their own to argue about policy or reasons—they were given their orders and obeyed them without question. It does not seem to us that there is any difference between the two. The German airmen were equally bound to obey orders and no individual crime can be laid against them for carrying out those orders. There may be individual cases in which Hun airmen sent out on reconnoitring flights, with no orders to bomb towns, found themselves over places like Margate or Ramsgate and dropped bombs there for the pure love of killing. In such cases as these, if the facts can be *prima facie* proved, by all means let us demand that the airman concerned shall be handed over to be tried as a common murderer. So in the case of the airmen who bombed and machine-gunned hospitals. Unless it can be shown that they were definitely ordered by superior authority to do exactly as they did, they also should be tried in the same way and, if found guilty, should meet the fate they deserve. Here again, is it certain that in all cases where Red Cross hospitals have been bombed, they were clearly

indicated as Red Cross hospitals? We have heard some pretty ugly stories about this in regard to "replies" given in Parliament. Some day there may be some light thrown upon this aspect of the case, and not overmuch in favour of honest answers as given by Government.

The question of what should be done in the matter of the authority issuing those orders is a different matter entirely. According to the law of nations, the bombardment of open towns is expressly forbidden. The terms of the Geneva Convention, to which Germany was a willing subscriber, also lay down that hospitals and hospital ships shall be immune from attack. In all cases, therefore, of attacks on open towns and hospitals it is quite clear that the law of nations and the usages of civilised warfare have been wantonly and brutally broken. It is equally clear that unless the ultimately guilty parties are brought before a competent tribunal and punished for their crimes, the law of nations has become a mockery and a thing of no effect. There will be no future deterrent to other ill-disposed nations, or even to Germany herself, who may wish to snatch an advantage from similar or even worse atrocities, since there will be a precedent of complete immunity for them to go upon. This is a matter into which magnanimity does not enter at all, and we simply cannot afford to let these people escape without due punishment. After all, the law is only effective when it is enforced and unless we visit with condign punishment every breach of it that can be brought home to the Huns, however highly placed the responsible individuals may be, the law will simply become a laughing-stock and a jest. For the sake of posterity, no less than for our own, we cannot afford to set a premium on wrong-doing, either by nations or by individuals. Therefore, the German Higher Command must be duly brought to book for its policy of aerial frightfulness, no less than for the atrocities of Louvain and the German prison camps. Nothing less will satisfy the conscience of the world.

* * *

**Protecting
the
Profiteers**

The question of tariffs and their bearing on industry is always a delicate one to discuss in the columns of a journal which, by its very nature, cannot indulge in political leanings one way or the other. For that reason, it would be entirely out of place for us to pass any judgment on the broad issues of Free Trade *versus* Protection, further than to say that the lessons of the War have brought it home to a great many people who were previously of a contrary opinion that it is essential for our own self-protection that our key industries should be afforded a certain measure of safeguard against foreign competition. But, if that safeguard is to be found in the imposition of a protective duty, it is clear that we must be exceedingly cautious in the manner of our procedure and that we must watch most carefully to see that no undue influences are brought to bear to secure most-favoured treatment of any industry, however important, at the sheer expense of the consumer.

We are minded to those reflections by the example of what is happening now in the case of the paper-making industry. During the War the importation of foreign-made paper was prohibited on account of lack of tonnage—quite rightly, it may be—and the price of British-made paper was "controlled" at a figure disproportionately high in comparison with pre-war rates. It may be said by some of our readers

Flight—And the Men



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MR. A. V. ROE, O.B.E., Chairman and Chief Designer of Messrs. A. V. Roe and Co., Ltd.

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MAY 15, 1919

that the price of paper does not interest them, and in any case that it has nothing to do with aviation. We submit, however, that it has a great deal to do with everyone and that as an example of how Trusts are initiated it is of intense interest to the whole community. Now, the present position is that there is a high protective duty on imported paper, but no countervailing excise tax on the British product, with the consequence that paper still sells at an inordinately high price. That means, as a matter of course, that the consumer has to pay more for smaller books and smaller newspapers than he was used in the days before the War. If the British paper manufacturer had been the victim of foreign dumping there would be nothing to be said against protecting him in the future, but he has not, since the annual output of British mills of paper for printing and posters was over 850,000 tons, of which 90,000 tons were exported. Imports of foreign paper were 180,000 tons, which does not argue any great depression in the British trade.

The paper-maker is crying for Protection for his trade, but he wants the pulp which is the basis of his business imported free of duty because it is a raw material. But he seems to ignore the fact that paper is to a far greater extent a raw material than pulp. According to reliable figures, papermakers, at the time of the 1911 census, numbered less than 25,000. The total number of persons employed in general work in connection with "paper, prints, books and stationery" was 340,000 or fourteen times the number engaged in paper-making. It is surely sufficiently obvious that the interests of the paper manufacturer in cheap pulp are inferior to those of the 340,000 to whom paper is the raw material of their business. Yet this relatively small industry is able to influence the Government to the detriment not only of the vast printing trade, but of the public at large which has rightly come to regard cheap publications as a necessary of life.

The *Evening Standard* puts the case excellently well when it says that if an import duty on paper is considered necessary, the taxpayer has a right to a guarantee that what he pays in extra price shall go into the Exchequer. Without a countervailing excise duty on home-made paper or, alternatively, a duty on imported pulp, the simple effect would be to subsidise an industry which has always shown a disposition to form a "corner" instead of relying on its own enterprise and energy.

The question we should like to see answered is: Who is it behind the scenes who has been able to bring such pressure on the Government, as to secure

favoured treatment for the British paper manufacturer? And what is the nature of the influence that has been brought to bear to set up a condition of things which is nothing more or less than an outrage on the general public. It is very much to be hoped that a full discussion will take place in Parliament, else we shall have all sorts of similar hole-and-corner arrangements concluded by the "controls," and the end will be that the country will not listen to protection of any kind, even in the case of industries which are really "keys."

The Control of Trusts The Committee on Trusts, appointed by the Minister of Reconstruction in February of last year to consider what

action may be necessary to safeguard the public interest in view of the probable extension of trade organisations and combinations, has now completed its sittings and prepared its Report. It is understood that its recommendations are quite moderate, and chiefly take the form of recommending that the Board of Trade should establish in the United Kingdom tribunals which should be used for the investigation of the operations of monopolies, combines and trusts. The idea would be that the tribunals should consist of some six members, presided over by a permanent chairman with legal qualifications. They should have power to obtain the fullest information as to the activities of trade associations, so that public complaints arising out of their operations could be the subject of effective enquiry. Should the tribunals find that the existence of grievances is established, the Board of Trade would then indicate to the Government what action might be necessary to remedy any abuse. It is suggested, therefore, that a Trusts and Combinations Department of the Board of Trade should be entrusted with the task of drawing up a programme to secure the community against "the evils of monopoly" and to enable the public to obtain a larger share of the economic benefit which may result from the better organisation of industry."

It all sounds very well, but we should very much prefer to know that trusts and combinations were definitely forbidden by Act of Parliament and that their formation, or even their active projection, was a penal offence punishable by a long term of imprisonment. America has her anti-trust laws, and it seems reasonably clear that in the end we shall have to adopt them, so why not now as a part of the task of reconstruction? A good deal of the present unrest may be traced to these trust arrangements, even if they are only at an "understanding" stage.



The Peace Treaty by Aeroplane

In order that the Peace Treaty could be in the hands of the German Government at the same time as the terms were formally presented to the German delegates, at Versailles on May 7, a copy was despatched by aeroplane on the previous day to a Rhine aerodrome whence another machine conveyed it to Weimar.

Paris to Copenhagen

On a French military machine, the Danish Lieut. Pauli Krause, accompanied by Lieut. Sabouret, on May 10 flew from Villacoublay to Copenhagen in 8 hours, carrying a copy of the Peace Treaty to the Scandinavian Governments.

Lord Milner Flies to Paris

HAVING been summoned to Paris to discuss the question of Belgium's claim to a portion of what was German East Africa, Lord Milner, the Colonial Secretary, on May 10 chose the aerial way. This is said to have been Lord Milner's first trip in the air.

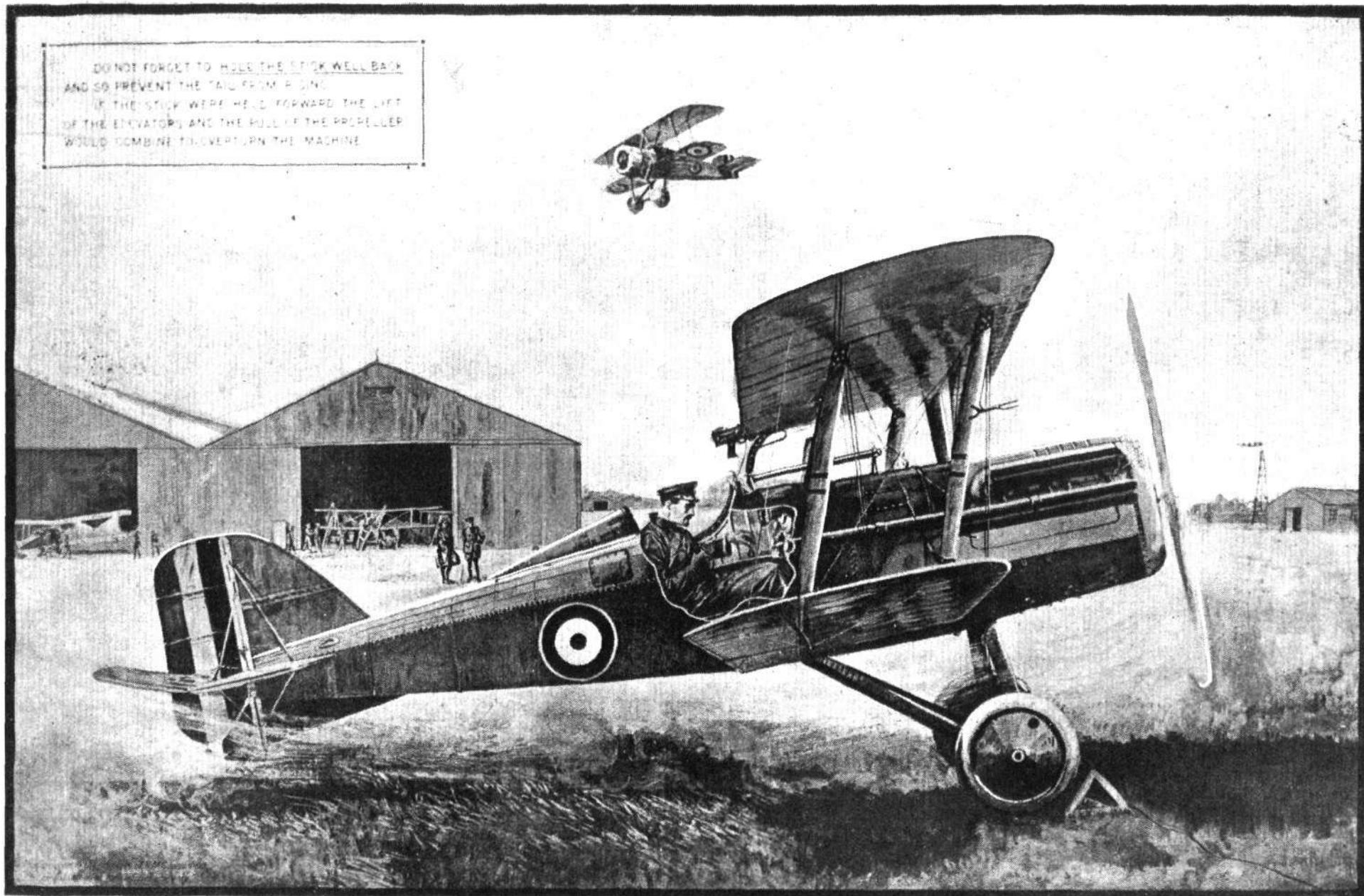
Germany Forbidden to Sell Aircraft

WORD comes from Paris that Gen. Nudant, on behalf of the Allied Governments, has informed the German Armistice Commission that all sales of German aeroplanes to foreigners are forbidden, and has demanded that immediate steps be taken to put a stop to such sales.

The Flight to Australia Prize

It is stated that the preliminary conditions of the Australian Government's offer of £10,000 prize for the first Australian airman to fly from Great Britain to the Commonwealth have been arranged at a conference attended by representatives of Mr. Andrew Fisher (High Commissioner for Australia in London), the Royal Aero Club, and the Air Ministry.

The prize, which must be won before December 31, 1920, is open only to Australians in seaplanes, flying-boats, or aeroplanes of all-British make. The distance, varying from 15,000 to 17,000 miles, according to the route, must be completed in 720 hours.

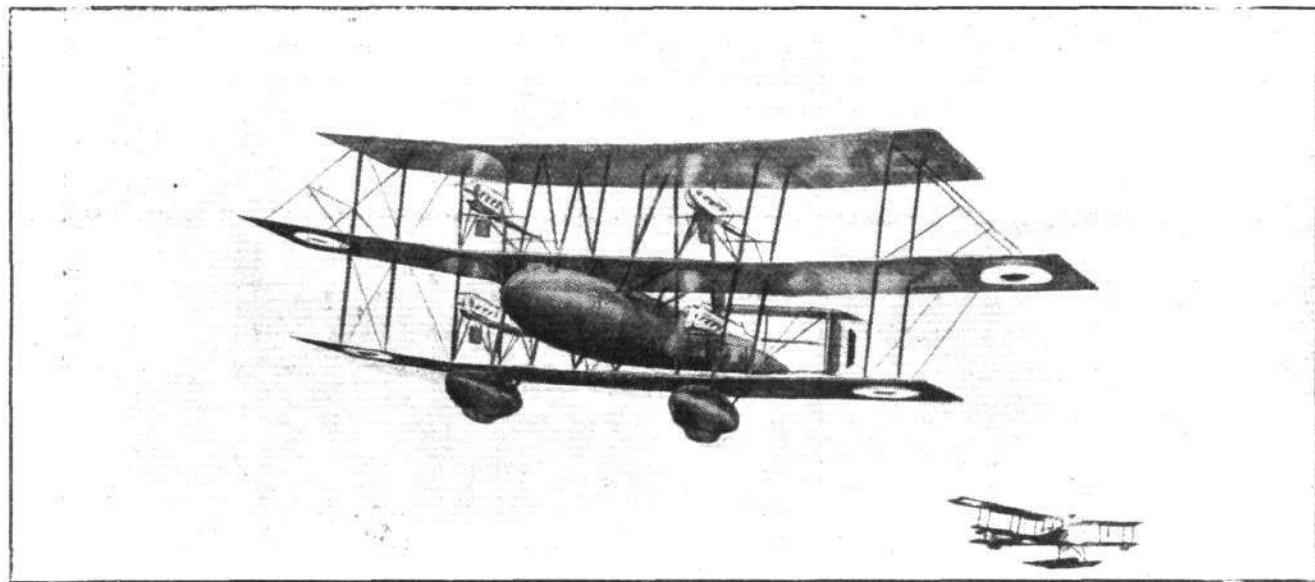


The position of the control stick when running engine on the ground. One of the series of drawings prepared by the Air Technical Services for using at the R.A.F. Schools.

THE TARRANT GIANT TRIPLANE, THE "TABOR"

AFTER a thorough examination of the Tarrant "Tabor" triplane, a brief reference to which was made in FLIGHT last week, it is a matter of some difficulty to decide which of its features possess the greater novelty—the aerodynamic design or the constructional principles adopted. Both present many unusual aspects. Probably on balance the

As regards the triplane arrangement, the unusual extension of the middle plane attracts attention at once. It might be noted here that only the middle plane carries *ailerons*, and in view of the extra load thus imposed upon the extensions of this plane the method employed for bracing the extensions may, perhaps, be open to criticism, a compression strut



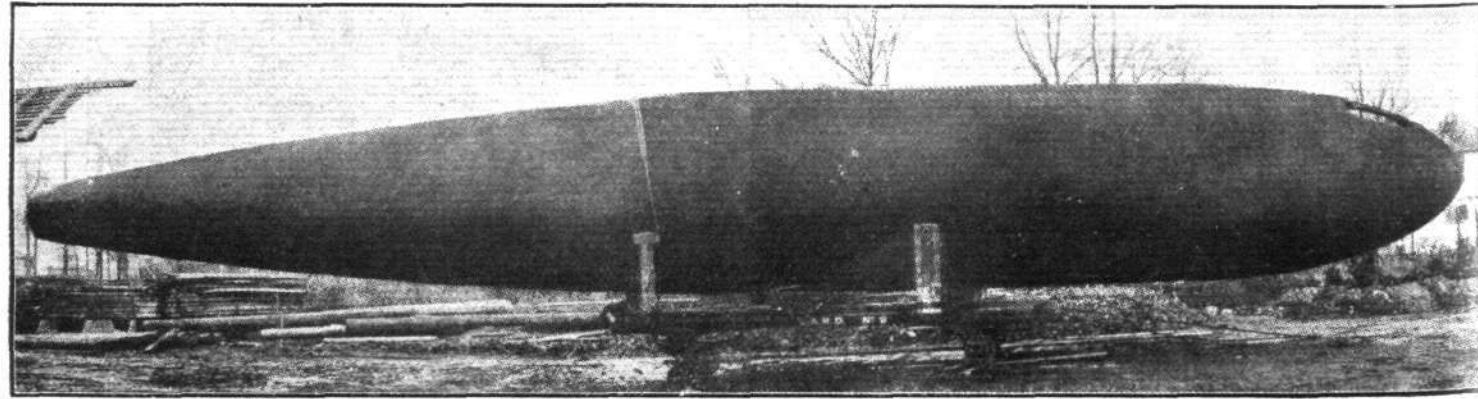
THE TARRANT "TABOR."—Sketch showing the machine as it will appear in flight

constructional side will be found to be the more interesting.

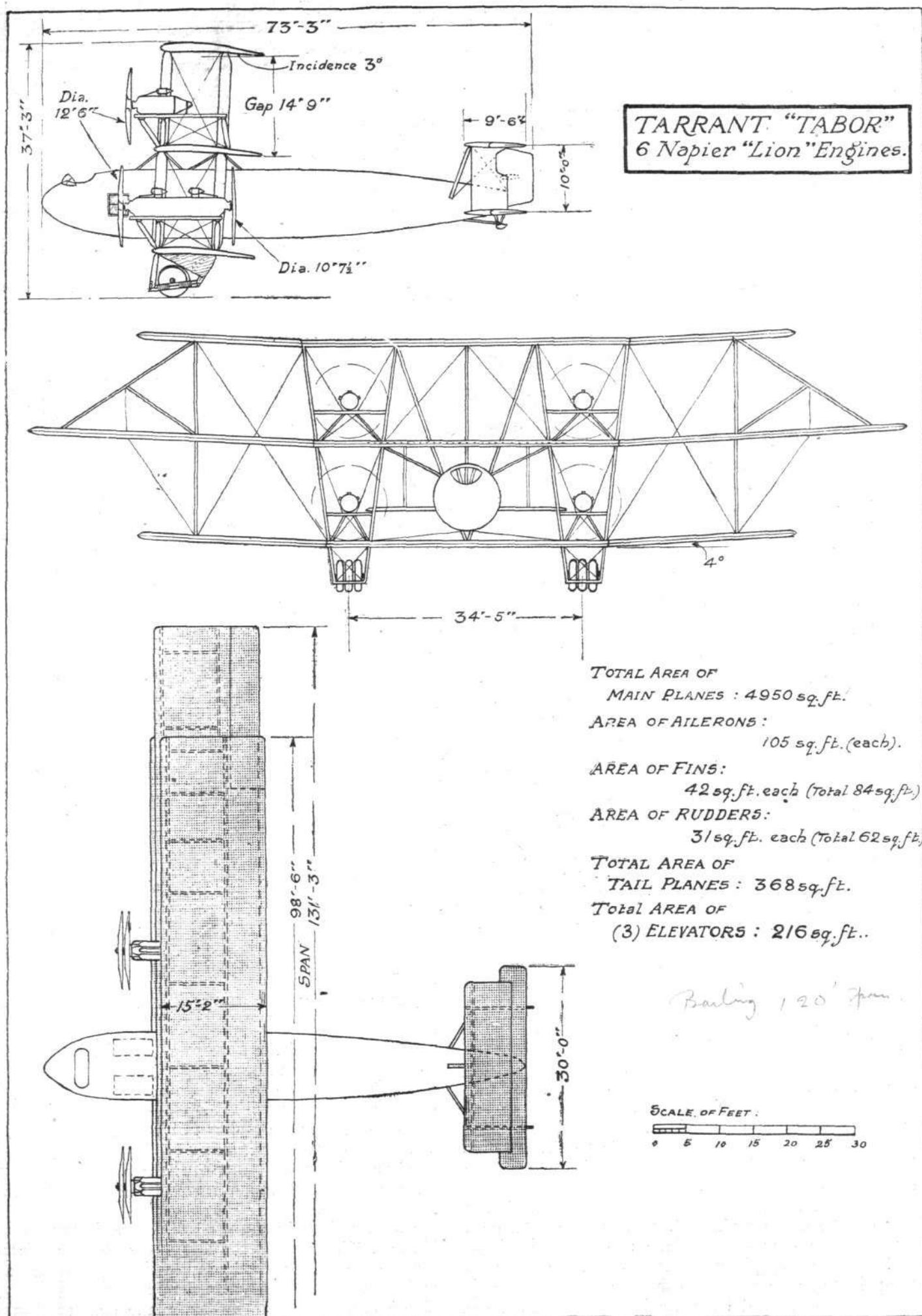
Aerodynamically the most striking features of the Tarrant "Tabor," apart from the great size of the machine, are the overhanging middle plane, with top and bottom planes of shorter span, and the disposition of the various thrust lines in relation to the centre of resistance. Dealing with these various features in the order given, the enormous size of the Tarrant "Tabor" impresses one instantly on seeing the machine. This impression is caused, not so much, perhaps, by the span, although 131 ft. 3 ins. is admittedly a great spread of wings, as by the height of the top plane. When standing close up to the machine, the 37 ft. 3 ins., which constitutes the distance from the ground line to the centre section of the top plane, looks a formidable height, and the two Napier engines, which develop some 450 h.p., each look almost ridiculously small, perched between the middle and top planes.

of great length taking the upward load. It is usually found that the middle plane in a triplane combination is very much less efficient than the other two, and probably the same would apply to the wing flaps of a middle plane. An extenuating circumstance is certainly formed by the fact that the upper and lower planes are of shorter span, and hence would not, presumably, affect the efficiency to the same extent. Since, however, there are generally disturbances in the neighbourhood of the wing tips, it may be that the *ailerons* will be affected. However, these are purely theoretical speculations, and only practical experiments can furnish conclusive proof.

Then there is the disposition of the various thrust lines, in other words, as direct drive is used in all instances, the placing of the six engines. From the front elevation of the G.A. drawings it will be seen that not only are all the engines placed far out on the wings, much farther than is usually found on



THE TARRANT "TABOR." —View of the great monocoque body



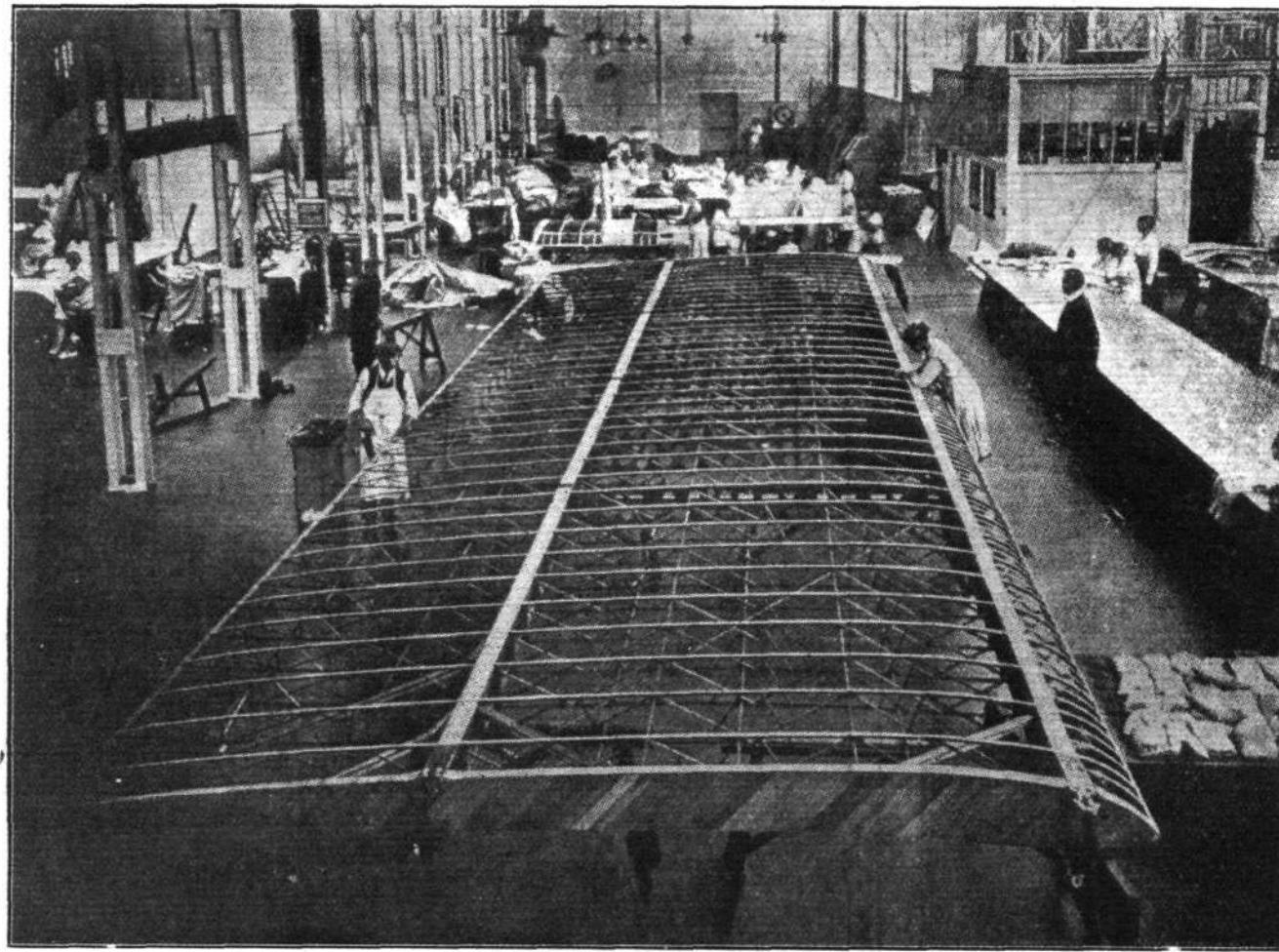
THE TARRANT TRIPLANE.—Plan, side and front elevations to scale

twin or multi-engined machines, but the two upper engines are placed very high. Probably, with all engines running, any discrepancy between centre of resistance and centre of thrust will not be great, but one imagines that in case one of the top engines cuts out, it might be necessary to shut off one of the engines on the opposite bottom plane to equalise matters. Or, looking at it in another way, if the thrust is right with the two top engines idle, forming, as it were, a reserve of engine power, then one would think that the switching on of these engines would raise the resultant centre of thrust, necessitating a considerable amount of tail plane trimming. When discussed with some of the Tarrant specialists recently, this point was more or less admitted, but it was then pointed out to us that any such tendency

ment, we understand, is to divide the top plane into "free lengths" of spars corresponding with the loading at any point; in other words, the greater the loading the shorter the free length of spar.

From the outer engine struts to the wing tips all the planes are given a dihedral angle of 4° , while the centre sections are straight. The machine is an orthogonal triplane, having its interplane struts at right angles to the chord lines (in side elevation), which virtually amounts to a slight negative stagger.

The tail of the Tarrant triplane is of the biplane form, but has, in addition to the two elevators hinged to the two fixed biplane tail planes, a third elevator placed as the middle plane in a triplane.



ONE OF THE PLANES OF THE TARRANT TRIPLANE.—This view gives a good idea of the size of the wings

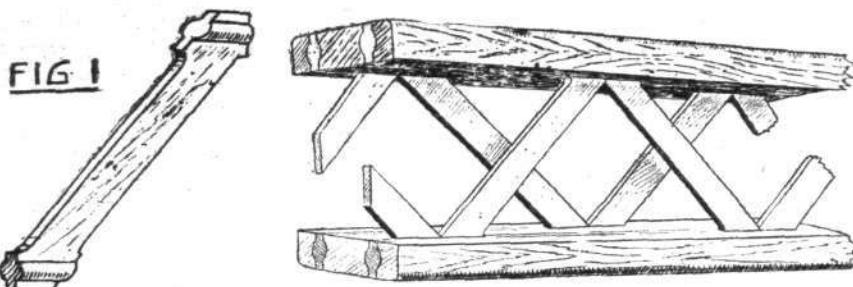
to bring the tail up would be counterbalanced by the down draught from the top plane. This is probably correct, and therefore the effects of the widely distributed engine placing may be smaller than one is apt to imagine at first sight.

Reference has already been made to the unusual bracing of the middle plane extensions. Equally out of the ordinary is the inter-plane strutting of the machine. The body, it will be noticed, does not rest on the bottom plane, but is supported from it by Vee struts, which continue through the middle and up to the top plane. The length of spar between the points of attachment to the upper plane of these Vee struts is halved by a vertical strut coming out of the top of the fuselage. The struts on each side of the engines diverge, counting from the bottom towards the top plane. The object of this arrange-

This elevator and the bottom one are both connected to the control column, while the top elevator is operated by a separate trimming-gear, placed in the side of the pilot's cockpit. This elevator takes the place of the ordinary moveable tail plane, and provides, it will be seen, for trimming of the machine by virtually altering the camber of the top tail plane rather than by altering the incidence of the usual trimming flat tail plane.

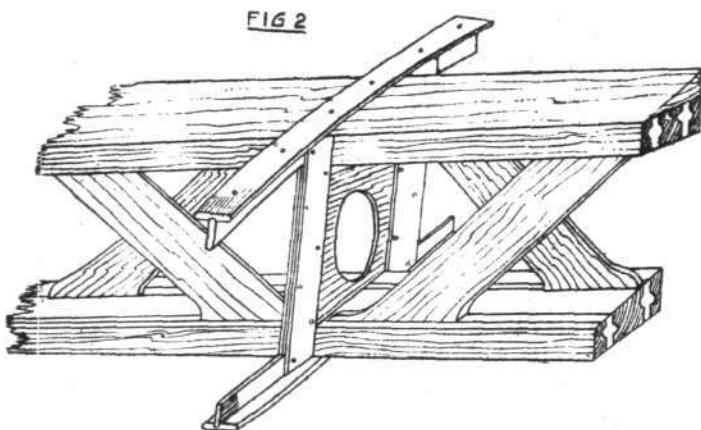
Constructionally the predominating feature of the Tarrant "Tabor" is the adaptation of the Warren girder principle to wood construction. In bridge and similar work the Warren girder has long been extensively employed, but for aeroplane construction its adoption has been delayed for various practical reasons. Whereas, in riveted metal girder structures the attachment of the braces to the flanges

does not present any great difficulties, it is another matter where wood is concerned. Not that wood does not have a good tensile strength, but the diffi-

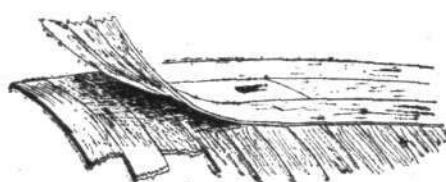
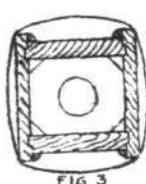


culty lies in providing good terminal connections, in other words, in securing the braces to the flanges of the beams. The first really practical way of doing this with woodwork that we have yet seen is that evolved by Mr. W. G. Tarrant, who has patented the method.

As one of the accompanying sketches (Fig. 1)

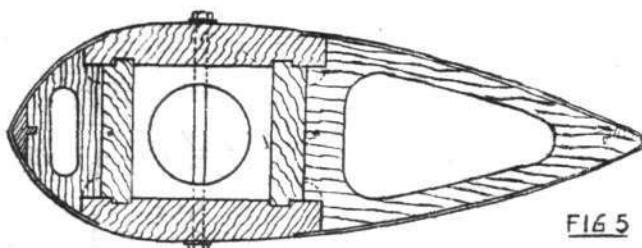


will indicate, the Tarrant method consists in building up spars, etc., of flanges built up in three vertical laminations, having grooves cut in them lengthwise. The webs, or more correctly the braces, consist of two Warren girders displaced relative to one another, the braces being beaded to fit the



grooves, and distance pieces glued in between the brace ends.

It will be seen that this form of construction, quite apart from its merits from the point of view of weight for strength, has the very great advantage

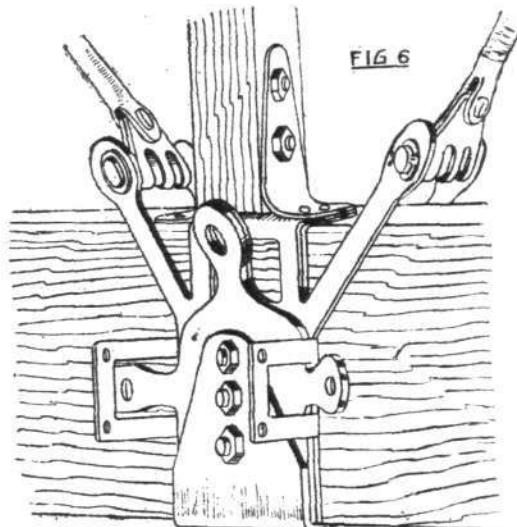


that quite small pieces of wood may be utilised, a fact which is of the greatest importance at a time when wood in such lengths as would be required for a machine of this size would be almost unobtain-

able. The very fact that such small pieces are being used is furthermore, in itself, a good factor of safety, since no defects are likely to remain undiscovered.

The same principle of construction has been applied to the spars of the tail planes, to the circular formers of the fuselage and to the *longerons* for a certain portion of their length. As regards the weight-strength ratio of wing spars made on this principle, we are informed that the designers of the Tarrant machine have found that such construction results in a saving of about 10 per cent. in weight for the same

strength compared with a box section spar, provided it is assumed that for practical reasons it is not possible to make the walls of the box section thinner than



$\frac{3}{16}$ in., which assumption is probably quite justified. It would, therefore, appear that Mr. Tarrant has discovered a method of construction which has very much to recommend it; at any rate, for the very large aeroplanes of the future, assuming that wood will remain the material employed for most of the component parts of the machine for some years to come. That metal will ultimately supplant it is not unlikely.

The wing ribs are of standard type, and are made in spruce. It might be mentioned, incidentally, that the wing section is that known as R.A.F. 15. The ribs are attached to the spars in such a manner as to transfer the shear stress from the rib to the spars. How this is accomplished will be understood from an inspection of one of the accompanying sketches (Fig. 2). A three-ply tongue passes between top and bottom spar flanges, extending a short distance on each side of the spar. Tacked and screwed to this tongue are on each side two vertical strips tacked to the rib webs, and having between them a packing piece of the same thickness as the rib web.

While on the subject of the wing ribs, mention may be made of the internal compression struts for the drag bracing. In some machines these members are in the form of box ribs, others employing square section solid wood struts, while still another way is to use steel tubes. In the Tarrant "Tabor" the compression struts are of a built-up square section as shown in the sketch Fig. 3. A similar construction is employed for the interplane struts, with the addition, of course, of a fairing. This takes the form of two-ply wood of similar construction to that used in the covering of the fuselage. This ply-wood work is made on moulds of the required shape, the layers

being put on so as to get the grain of the two laminations running approximately at right angles to one another (Fig. 4). It is put on in $1\frac{1}{2}$ in. wide strips, varying in thickness from 1 mm. to 3 mm., according to the work it has to do. A section of one of the interplane struts is shown in Fig. 5. In Fig. 6 is shown a typical spar fitting.

The *ailerons*, or wing flaps, which, as already mentioned, are fitted on the middle plane only, are a little over 100 sq. ft. each, and are so mounted as to be balanced for their whole length, and not only by a small portion at the tip. This is accomplished by pivoting them about a third of their chord from the leading edge, the hinges being carried by stout box ribs. To reduce the chord of the *ailerons*, which

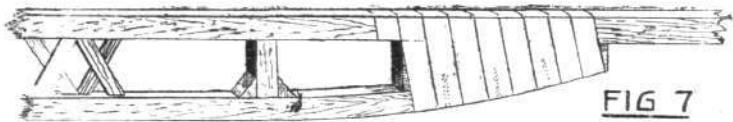


FIG. 7

would have been excessive had they been hinged to the main rear spar, there is a false spar overhung on the box ribs from the rear main spar. The chord of the *ailerons* is 3 ft. 9 ins., with the hinge line 9 ins. from the leading edge.

The *fuselage* is of the *monocoque* type, built up of circular formers or rings, constructed on the same general principle as that already dealt with in describing the wing spars, and of *longerons* similarly constructed as regards a certain portion of their length. The whole is then covered with a skin of two-ply wood, put on in two thicknesses of narrow strips, crossing one another approximately at right angles. The workmanship of the body construction is excellent, and the *monocoque* form has, among others, the very great advantage of giving much more space inside, there being no bracing wires, etc., to divide the space up into a series of "birdcages."

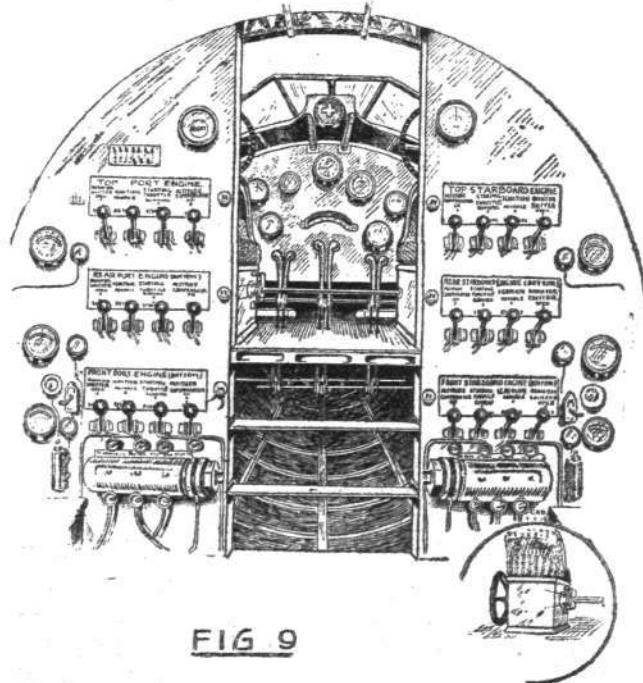


FIG. 9

The importance of this for passenger carrying will be obvious. It should be mentioned that it is only the main formers which are built up of Warren trusses. Between these main formers are lighter single formers. From the side elevation of the general arrangement drawings, it will be noticed that the *fuselage* is parallel for a certain portion of its

length. The *longerons* in this portion are Warren girders, while towards the stern they are tapered down to single members, as shown in Fig. 7. The method of attaching the Warren girder *longerons* to the formers of that construction, without resorting to cutting either, is the subject of another illustra-

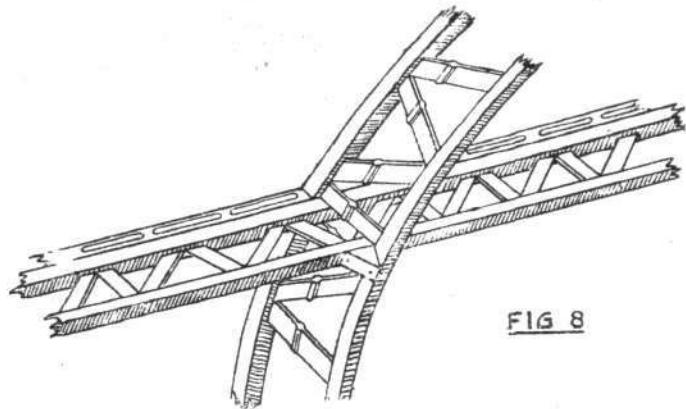


FIG. 8

tion (Fig. 8). The flanges of the former pass outside the flanges of the *longerons*, and to bring the outer *longeron* flange flush with the covering a packing piece is employed as shown in the sketch. The sketch is, we think, self-explanatory.

The two pilots, who are placed in the nose of the *fuselage*, sit side by side, and all controls are duplicated. The *ailerons* and middle and bottom elevators are operated by hand wheels, and the rudders by foot bars in the usual way. For trimming the tail there is on each side a wheel, one for each pilot, geared to the top elevator.

Immediately behind the pilots' seats there is a transverse partition, forming the engineer's dashboard, on which all the various engine controls—

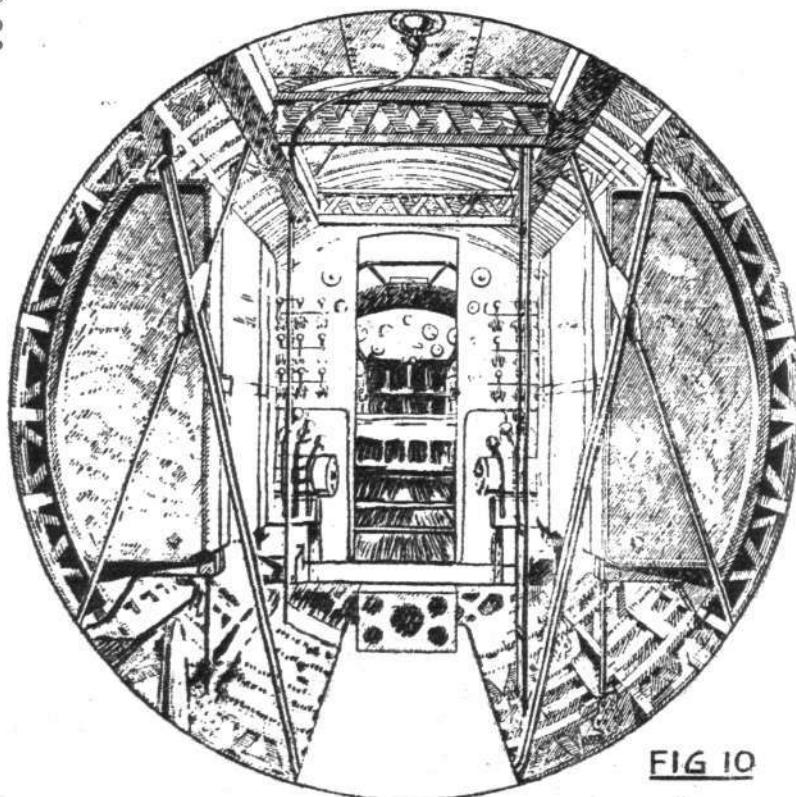


FIG. 10

and they are necessarily numerous where six engines are fitted—are mounted in readily accessible positions. The sketch Fig. 9 shows this dashboard, and a portion of the pilot's cockpit, seen through the door communicating with the engine room.

Provision is made for the engineer to climb out on to the wings, through a hatchway, thus gaining

access to any of the engines that may require attention.

Most of the petrol is carried in the *fuselage*, in tanks mounted on the sides and top, so as to leave the centre of the body clear. The manner of placing the tanks will be seen in Fig. 10.

The tail unit is of fairly orthodox design, and does not call for any special comment. The only detail in which it differs from standard practice is, as already mentioned, that trimming is not effected by altering the angle of incidence of the fixed tail planes, but by altering the angle of the top elevator. There is no

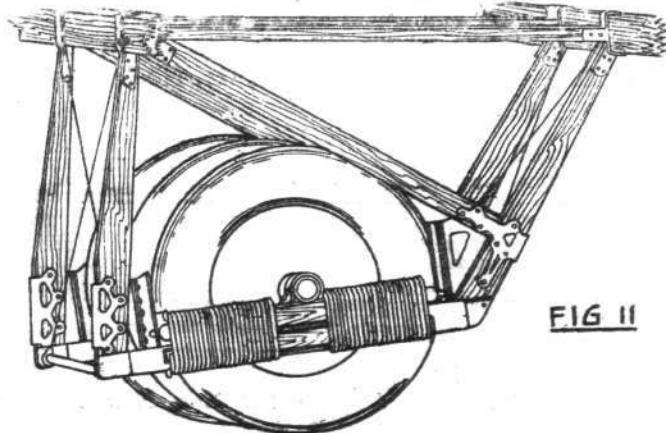


FIG. 11

adjustment of the tail planes during flight, but the bottom tail plane is so mounted as to allow of slight adjustment when the machine is on the ground.

The undercarriage consists of two separate units, each placed vertically below the engines. The sketch, Fig. 11, will give an idea of one of these units. Each unit consists of what, for want of a better term, we shall call two truncated Vees, across the lower members of which is slung the very substantial axle carrying three wheels inside the Vees. The size of the Palmer cord wheels, by the way, is 1,500 by 300. At its outer ends the axle is carried in a bearing mounted on a stout longitudinal member, which is free to travel up and down, but is guided as regards lateral and longitudinal movement. This beam is sprung by rubber cord wrapped around it and the fixed bottom member of the "truncated Vee." The sketch will explain the principle. Needless to say, front and rear panels of each chassis unit are braced to take lateral loads.

As shown in the G.A. drawings, the engines are placed as follows:—Two on the middle plane, one on each side, driving tractor screws, and four in two tandem sets on the lower plane, driving tractors and pushers respectively. The engines are all Napiers of about 450 h.p. each. The tractor air-screws are two-bladed, and of 12 ft. 6 ins. diameter, while the pusher screws are four-bladed, and have a diameter of 10 ft. 7½ ins. The engines can be started from the cockpit by the Maybach system. A vaporiser is placed near the engines, and connected up to a hand pump in the *fuselage*. To start the engines the exhaust valves can be lifted, petrol or ether vapour pumped into the cylinders, the valves closed, and the mixture exploded by a spark from a hand magneto on the engineer's switchboard. It might be mentioned that in order to facilitate starting, provision has been made for heating the cooling water. Later on, we understand, it is intended to fit an electric starter, as soon, in fact, as a reliable one has been evolved.

As regards the ignition system, each engine is fitted with two magnetos. The earth wires for each

magneto are carried to the engineers' control board, on which is a double switch for each engine. Each of these switches controls the two magnetos on one engine. From these switches leads are taken to a master switch capable of earthing the 12 magnetos simultaneously. This master switch is placed in the pilot's cockpit, within easy reach of either pilot. On the engineer's control board are mounted two starting magnetos, one serving three engines via a distributor switch. That is to say, the one starting magneto serves all three starboard engines, the other serving all three port engines.

The cooling system is so arranged that each engine has its independent system. A pump draws the cool water from the bottom of the radiator through a pipe into the engine. After being forced through all the channels of the water jackets, etc., the water passes through a pipe into the bottom of the water tank, which is mounted above the engine, and is in shunt with the system. The radiators are placed under the engines, and are provided with shutters for regulating the cooling.

In conclusion, it might be mentioned that the weight, fully loaded, of the Tarrant "Tabor" is about 45,000 lb., of which 19,000 lb. is useful load. The amount of petrol carried is 10,000 lb., leaving 9,000 lb. for passengers and/or cargo. This 10,000 lb. of petrol is sufficient for a flight of 900 miles at maximum speed, while at the cruising speed the range of the machine is estimated at 1,200 miles, with the 10,000 lb. of petrol. If fewer passengers are carried, and the weight made up with fuel, this range can, of course, be still further increased. The ceiling of the machine has been estimated at 13,000 ft., and the estimated climb is as follows:—5,000 ft. in 10½ mins., 10,000 ft. in 33½ min., 13,000 ft. in just over one hour.

The following is a table of leading dimensions and weights of the Tarrant "Tabor":—

| | |
|--|--|
| Engines, six 500-h.p. Napier "Lion." | Area of fin, 42 sq. ft. each, total 84 sq. ft. |
| Span: middle plane, 131 ft. 3 in.; top and bottom plane, 98 ft. 5 in. | Area of rudders, 31 sq. ft. each, total 62 sq. ft. |
| Total surface of wings, 4,950 sq. ft. | Area of tail planes, 184 sq. ft. each, total 368 sq. ft. |
| Overall height, 37 ft. 3 in. | Area of elevators, 81 sq. ft. each, total 162 sq. ft. |
| Overall length, 73 ft. 2 in. | Area of inter-elevator, 54 sq. ft. |
| Body, round streamline, maximum diameter 11 ft. | Span of tail planes, 30 ft. |
| Gap: top and middle planes, 14 ft. 9 in.; middle and bottom planes, 14 ft. 9 in. | Gap of tail planes, 10 ft. |
| Chord, 15 ft. 2 in. | Wings are set at 3 deg. to the body. |
| Dihedral, 4 deg. on all planes. | Top tail plane at -2 deg. to the body. |
| Area of ailerons, on middle plane only, 105 sq. ft. each = 210 sq. ft. total. | Bottom tail plane at 0 deg. to the body. |

Weights

| | Lbs. | Lbs. |
|---|-------|--|
| Top plane .. | 1,903 | Tail skid 60 |
| Bottom plane .. | 2,691 | Controls 501 |
| Middle plane .. | 1,833 | <hr/> |
| Interplane struts .. | 2,543 | Total 6,733 |
| External bracing wires 608 | <hr/> | |
| Total 9,578 | | |
| Tail planes 334 | | Engines, propellers, radiators and water, etc. 7,200 |
| Elevators 117 | | Engine accessories .. 650 |
| Fins 98 | | Petrol and tanks (1,600 |
| Rudders 40 | | galls.) 12,662 |
| Total 589 | | Oil and tanks, etc. (92 galls.) 1,050 |
| Fuselage (including bomb girders) 3,590 | | Crew (five) 1,080 |
| Chassis 2,582 | | W.T. 100 |
| | | Guns and ammunition 380 |
| | | Bombs and gears .. 4,650 |
| | | <hr/> |
| | | Total 44,672 |

Mr. Tarrant, on the recent occasion when Press representatives were permitted to view the machine, stated that he wished to express his thanks to the Royal Aircraft Establishment at Farnborough, without whose very valuable and willing assistance the problems of erecting and trueing up the machine would have been rendered even more difficult than had been the case, and in this direction he should like to mention Majors Turner and Grinstead, of the R.A.E., who have both given their unstinted help in the many problems that, in the very nature of the job, have kept cropping up. Of those directly associated with Mr. Tarrant it would be impossible to mention more than a few: Capt. E. T. Rawlings, D.S.C., who is general manager of the firm, will be remembered by all FLIGHT readers as having taken part in the famous flight in a Handley Page from London to

Constantinople, bombing the Turkish capital with excellent effect. Captain T. M. Wilson, of the Technical Department of the Air Ministry, was originally lent to Mr. Tarrant, but has now joined the firm. It was to a large extent due to Captain Wilson that the machine was turned into the flying proposition it is now.

Finally, it should be pointed out that the man who will pilot the machine is Captain F. G. Dunn, A.F.C., who will be remembered by our readers from the days before the War, when he was one of the Grahame-White pilots at Hendon, forming one of the batch who joined up with the air forces immediately on the outbreak of hostilities, and who numbered among them such pilots as, to mention only a few, Strange, Carr, Lillywhite, Noel, Howarth, Pashley, and Manton.



The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Entrance Fee and Subscription for New Members
In accordance with the Resolution passed unanimously at the Annual General Meeting of the Royal Aero Club, on March 31, 1919, the Subscription for Members elected on or after May 31, 1919, will be £7 7s. per annum, and the Entrance Fee £5 5s.

TECHNICAL COMMITTEE

A MEETING of the Technical Committee was held on Monday, May 5, 1919, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Lieut.-Col. D. Harries, Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Major R. H. Mayo, Lieut.-Col. Alec Ogilvie and Mr. Howard T. Wright. In attendance:—Lieut.-Col. Towler and Major Bernard of the Air Ministry and Mr. H. Fulton, Mr. A. R. Fenn and Mr. C. V. Allen of the Society of British Aircraft Constructors. Mr. Harold E. Perrin, Secretary.

The Committee considered the Regulations governing the Prize of £10,000 offered by the Australian Government for a flight from Great Britain to Australia.

The Flying Services Fund

H.R.H. Prince Albert, K.G., has been pleased to accept the Chairmanship of the Flying Services Fund.

At the present time nearly two hundred widows and dependents of airmen are receiving benefits from the Fund, and the education of over one hundred and fifty children is being undertaken.

A Meeting of the Flying Services Fund Committee was held on Wednesday last, May 7, 1919, when there were present:—Brig.-Gen. R. H. More, C.M.G., in the Chair, Mr. Chester Fox and Mr. B. Stevenson, Assistant Secretary.

Grants and Allowances.—The following Grants and Allowances were made:—

(92) A continued allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(103) A continued allowance of £1 10s. a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(194) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force who had died on active service.

(196) An allowance of £1 a month for six months to the mother of a Private in the Royal Air Force who had died on active service.

(198) An allowance of £4 a month for six months to the widow of a Captain in the Royal Air Force who had been killed on active service.

COMMITTEE MEETING

A Special Meeting of The Committee was held on Tuesday, May 13, 1919, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Lieut.-Col. J. Dunville, R.A.F., Lieut.-Col. F. K. McClean, Brig.-Gen. E. M. Maitland, D.S.O., Lieut.-Col. Alec Ogilvie and Mr. H. E. Perrin (Secretary).

Election of Members.—The following New Members were elected:—

Major George Henry Abell, R.A.F.

Lieut. Ernest Allingham, R.A.F.

Capt. Joseph Dover Atkinson, R.A.F.

Philip Conway.

Major Cecil Hill Darley, R.A.F.

Cyril Joseph Feeny.

Capt. Gerald William Garthergood, R.A.F.

David Gill.

Capt. Lacy Norman Glaisher, R.A.F.

John Leonard Greener.

Capt. William Ernest Bertram Holland (Scottish Horse).

Norman Robert Melville.

Flight-Lieut. Karel Muller (Royal Dutch Naval Air Service).

Capt. Sydney James Read, R.A.F.

Capt. John Guy Russell, R.A.S.C.

Charles Louis Scott.

Major George Herbert Scott, R.A.F.

Lieut. Cuthbert Henry Dolling Smith, R.A.F.

Capt. Fred Wilkinson (South Staffordshire Regt.).

Rolls Memorial Library

The following Committee was appointed to go into the question of purchasing books for the Club:—

Mr. C. G. Grey.

Major C. C. Turner.

Mr. Howard T. Wright.

TECHNICAL COMMITTEE

A MEETING of the Technical Committee was held on Tuesday, last, May 13, 1919, when there were present:—Lieut.-Col. F. K. McClean, in the Chair, Mr. Griffith Brewer, Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., Major R. H. Mayo, Lieut.-Col. Mervyn O'Gorman, C.B., Lieut.-Col. Alec Ogilvie, Lieut.-Col. H. T. Tizard, Mr. Howard T. Wright and Mr. Harold E. Perrin, Secretary.

World's Aeronautical Records.—The Committee fully discussed the question of World's Aeronautical Records with particular reference to the British performances put up during the War.

The regulations governing records recognised by the Fédération Aéronautique Internationale were also considered and it was decided to put forward various suggestions for the alteration of these regulations at the Conference of the Fédération Aéronautique Internationale to be held in Paris on the 19th inst., at which the Club will be represented by:—

Lieut.-Col. F. K. McClean.

Lieut.-Col. Alec Ogilvie.

Lieut.-Col. Mervyn O'Gorman, C.B.

Mr. Harold E. Perrin (Secretary).

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

A CIRCUIT OF BRITAIN FLIGHT

A REMARKABLE and record flight round Great Britain has recently been accomplished by a twin-engined Handley Page (two 350 h.p. Rolls-Royce engines) carrying two pilots, Major K. R. Park, R.A.F., and Capt. Stewart, R.A.F., two navigators, Major B. E. Smythies and Lieut. Wilson, three engineers and fitters and two wireless operators—a total crew of nine. Sixteen hundred miles were covered, and the whole journey was completed in thirty hours' flying—a very creditable result in view of the poor weather prevalent.

The flight was begun from No. 1 R.A.F. School of Navigation at Andover at 2.15 a.m. There was some moon, but visibility was bad, a good deal of haze being encountered. The first stage was to Waddington, *via* Portsmouth, along the coast past Brighton to Ashford and Canterbury, and thence by Shoeburyness, Clacton, Lowestoft, Hunstanton, and across the Wash to Waddington, which was reached at 9 a.m.

Certain necessary engine adjustments were effected here, and the flight resumed at 1.28 p.m. on the same day. The weather had improved somewhat, and Grimsby, Scarborough and South Shields were passed in better visibility. By the time Alnwick was reached at 5 p.m., however, conditions had deteriorated rapidly. Rain set in with low clouds and a strong westerly wind which rendered it necessary to descend from 3,000 to 800 ft., and then to 350 ft., at which height St. Abb's Head was rounded. It had been intended to proceed to Longside on this stage, but in view of the weather conditions, the machine was turned west to Edinburgh, and a landing effected at Turnhouse at 6.45 p.m.

The following day the machine got away again at 11.50 a.m., and by way of Arbroath, Aberdeen, Longside, Inverness, and the Mull of Kintyre, Belfast was made at 7.5 p.m. Once again the weather was bad and visibility so poor that the aerodrome at Aldergrove could not be picked up. Owing to adverse winds petrol was running very low, and a landing had to be effected without further delay. It was at this point that a very remarkable feat was achieved in bringing the huge

machine safely down on Messrs. Harland and Wolff's wharf at Belfast at 7.5 p.m. This wharf is about 400 yards long, and only very slightly wider than the actual wing span of the Handley Page itself. In view of the extremely limited area and the fact that the aeroplane had to be landed *across* wind, this landing constitutes a record in itself. Moreover, to lighten the machine so that it could be taken off again within the short run available, all the crew with the exception of Major Park were left behind to proceed to the aerodrome by road.

Aldergrove aerodrome was left at 1.35 p.m. the next day, and a course set for Dublin and thence to Bardsey Sound, which involved an oversea passage of 68 miles. Newquay was the next point made, and the day's stage was completed at Pembroke at 5.50 p.m., where some further engine adjustments were effected. The last day of the circuit provided the best weather. An early start was made at 4.26 a.m., and after another oversea passage of 17 miles, Burry Holmes was reached. Thence the coast was followed to Boscastle, where a course was set inland to Bodmin and Plymouth, and then along the coast once more to Bournemouth before turning in to Andover—thus completing the circuit at 9.32 a.m. on the fourth day.

The average air speed maintained throughout was 66 m.p.h., while each day's run averaged 450 miles.

Another very successful night flight also made from this same R.A.F. Navigation School was from Andover to Bal-donnel (Dublin). The night was intensely dark, and it was practically impossible to pick up land marks. Accordingly the flight was done on compass bearings—due allowance being made for "drift." The calculations had been so accurately worked out and the course so skilfully set that the navigator brought the machine out directly over Dublin—a remarkable achievement considering that 75 miles was an oversea passage. The entire journey was completed in 6½ hours.

THE PEACE TREATY

THE following is the excerpt from the official summary of the Peace Treaty, which deals with Section V relating to the Military and Naval Air clauses. The note on Section XI is also given:—

Air.

The air clauses provide that the armed forces of Germany must not include any military or naval air forces. Germany is, however, to be allowed to maintain a maximum of 100 unarmed seaplanes up to October 1, 1919, to be exclusively employed in searching for submarine mines. The entire personnel of the air forces in Germany is to be demobilised within two months, except for a total of 1,000 men, including officers, which may be retained up to October.

The aircraft of the Allied and Associated Powers are to enjoy full liberty of passage and landing over and in the territory and territorial waters of Germany until January 1, 1923, unless prior to that date Germany is admitted to the League of Nations or is permitted to adhere to the International Air Convention.

The manufacture of aircraft and parts of aircraft is forbidden throughout Germany for six months.

All military and naval aircraft (including dirigibles) and aeronautical material are to be delivered to the Allied and Associated Governments within three months, except for the 100 seaplanes already specified.

MEDICAL EXAMINATION FOR PILOTS'

A SPECIAL medical examination is necessary before a pilot can be granted a licence covering the carrying of passengers or goods for hire or reward.

Applicants should communicate in writing with the President of the Aviation Candidates Medical Board, 9, Arkwright Road, Hampstead, N.W., asking for an appointment, at least 48 hours before the time they desire to present themselves for examination. A fee of £1 1s. will be charged for the examination, which will take place normally between 2 p.m. and 4 p.m., on any day except Saturday and Sunday.

High Flying with 25 Passengers

At Toussus-le-Noble on May 5 the Farman "Goliath," with 25 persons on board, ascended to a height of 5,100 metres (16,600 ft.), the climb taking 1 hr. 15 min., while the descent was made in 25 minutes. Lieut. Bossoutrot was the pilot.

General

General articles provide for the modification of German laws in conformity with the preceding clauses.

All the clauses contained in the Treaty are to be executed by Germany under the control of Inter-Allied Commissions, to be specially appointed by the Allied and Associated Governments, for which the German Government is bound to furnish all necessary facilities and expenses of upkeep. The duties of the Military, Naval, and Aeronautical Commissions of Control are laid down in detail.

SECTION XI.

Aerial Navigation

Aircraft of the Allied and Associated Powers shall have full liberty of passage and landing over and in German territory, equal treatment with German planes as to use of German aerodromes, and with most-favoured-nation planes as to internal commercial traffic in Germany. Germany agrees to accept Allied certificates of nationality, airworthiness, or competency and licences, and to apply the convention relative to Aerial Navigation concluded between the Allied and Associated Powers to her own aircraft over her own territory. These rules apply until 1923 unless Germany has since been admitted to the League of Nations or to the above Convention.

LICENCES FOR PASSENGER CARRYING

The fee is payable at the time of examination.

If found medically fit a certificate to that effect will be given to the candidate, who should then forward it, together with his application for licence, to the Secretary, Air Ministry (C.G. C.A.).

When first communicating with the President of the Board, candidates should be careful to give their surnames and Christian names, together with information regarding their previous service (if any) in the Royal Air Force.

A French Height Record

On a Spad-Herbemont aeroplane fitted with a 300 h.p. Hispano-Suiza at Villacoublay on May 10, beat the French height record by going up to 8,400 metres (27,720 ft.). The old French record was 7,950 metres.

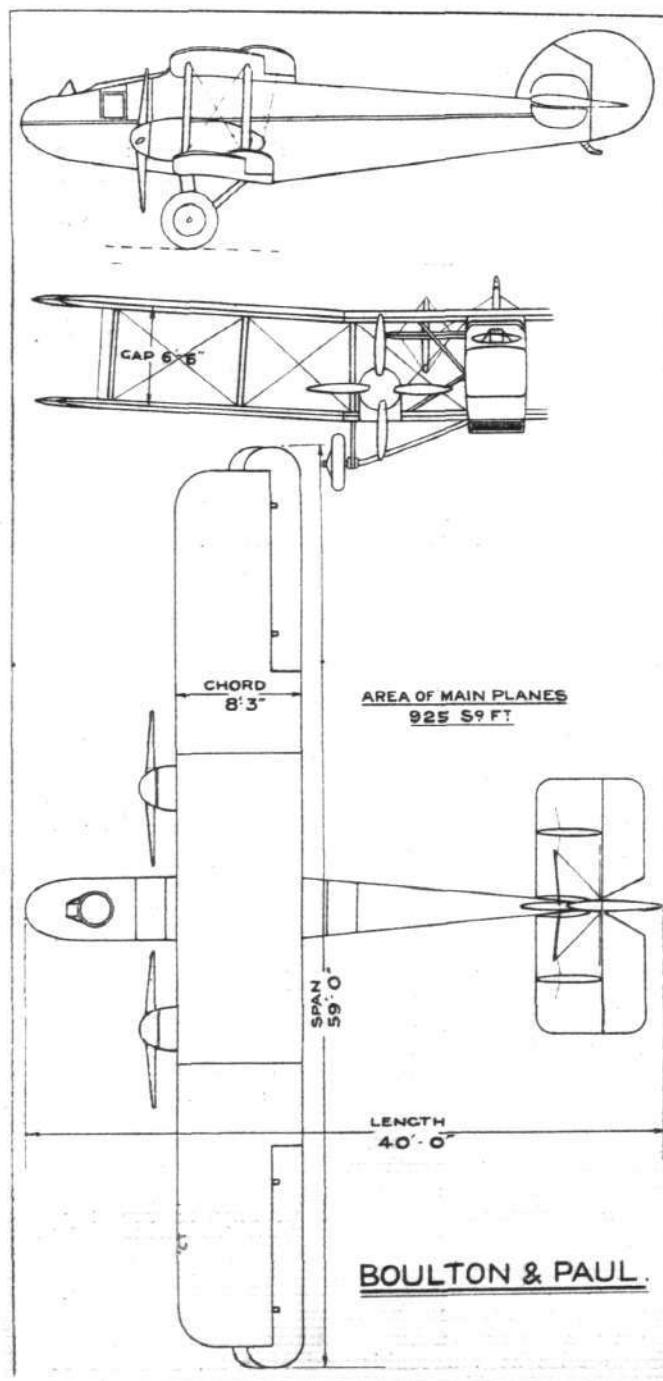
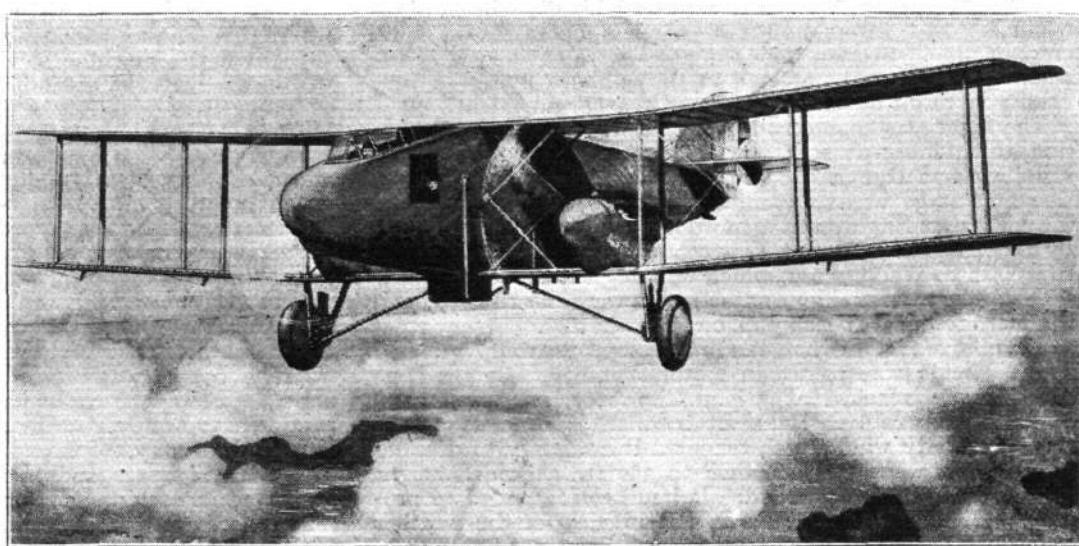
THE TRANSATLANTIC CONTEST

THE MACHINES

In our issue of April 10 we published scale drawings of the Sopwith and Short Transatlantic machines. At the time no further drawings were available, and other machines have

been entered since then. This week we are able, through the courtesy of the various constructors who have given us facilities for obtaining particulars of their machines, to

The Boulton and Paul-Napier Machine.—A drawing showing the machine as she will appear in flight



THE BOULTON AND PAUL-NAPIER MACHINE.—
Plan, side and front elevations to scale

place before our readers scale drawings of three other entrants and a photograph of a fourth, as well as scale drawings of one of the American flying-boats which will attempt the crossing *hors de concours*.

The Boulton and Paul Napier-Machine

ONE of the most important features of the Boulton and Paul machine (an illustration of which appeared in our issue of April 17) is that after a short time in the air (about two hours for the amount of fuel carried for the Transatlantic flight) the machine is able to keep aloft on one engine only. The importance of this can scarcely be exaggerated. It will mean, looking at it in another way, that after two hours the two Napier engines need only be run at half their power. This should mean an enormous increase in their chance to "stick it" for the whole journey. It is further to be noted that at the "cruising speed" the speed of the machine is as high as 116 m.p.h. This is probably the highest cruising speed of any machine entered so far for the race. When flying at the cruising speed the range of the Boulton and Paul machine has been calculated to be about 3,850 miles, so that there is an ample margin in hand for the Transatlantic journey.

The fuel is carried in six separate tanks, each fitted with jettison valves operated by a lock control in the pilot's cockpit. These valves will discharge the whole of the fuel in $1\frac{1}{2}$ min. in case of emergency, and the tanks are so placed that when empty they will keep the machine afloat and right way up. The crew will consist of three, a chief pilot and two navigators, who will also be wireless operators and assistant pilots. The names of the crew have not yet been announced.

Two independent wireless sets will be fitted, a "spark" wireless for sending and receiving messages, and a "directional" for navigation purposes. A small hydrogen bottle and a balloon will be carried so as to make it possible to send up an "aerial" for sending wireless "S.O.S." even after the machine is on the sea, should that emergency occur.

The chief characteristics of the B.P. machine are as follow:—

| | | | |
|--------------------------------|--------------|--------------------|--------------------------|
| Span | 59 ft. | Fuel capacity, oil | 90 gals. |
| Length | 40 ft. | Cruising range | 3,850 miles. |
| Height | 12 ft. 3 in. | Engines .. | Two 450 h.p. Napiers. |
| Weight loaded | 11,500 lbs. | Maximum speed | 148 m.p.h. |
| Fuel capacity, petrol | 800 gals. | Cruising speed | 116 m.p.h. |

The Vickers " Vimy-Rolls "

A BRIEF description and two photographs of this machine were published in last week's issue of FLIGHT. The "Vimy-Rolls," as the Transatlantic type is called, is very similar in general arrangement to the standard "Vimy." Minor changes have naturally been made, but the general appearance is the same. Among the changes made the most important is the substitution of larger tanks, which now have a capacity of 850 gallons of petrol and 50 gallons of oil. A further alteration which has been made is the addition of a turtle back to the fore part of the *fuselage*, resulting in a cleaner outline with, presumably, smaller resistance. Two standard Rolls-Royce "Eagle" engines are fitted, which

at full throttle give the machine a speed of over 100 m.p.h. The cruising speed is, however, in the neighbourhood of 90 m.p.h., and at this speed the machine has been estimated to have a range of 2,440 miles. Of other alterations reference may be made to the substitution, in the "Vimy-Rolls," of a front wheel mounted on a pyramid of steel tubes, instead of the front skid fitted on the standard "Vimy." The general arrangement drawings of the machine published herewith will give a good idea of the lines of the "Vimy-Rolls." As announced last week, the pilot is Capt. J. Alcock, D.S.C., who will be remembered by our readers from the days before the War, when he did a great amount of flying on a Maurice Farman biplane with Sunbeam engine. The navigator, Lieut. A. W. Brown, recently wrote a very interesting article for FLIGHT, dealing with elementary navigation for aircraft pilots.

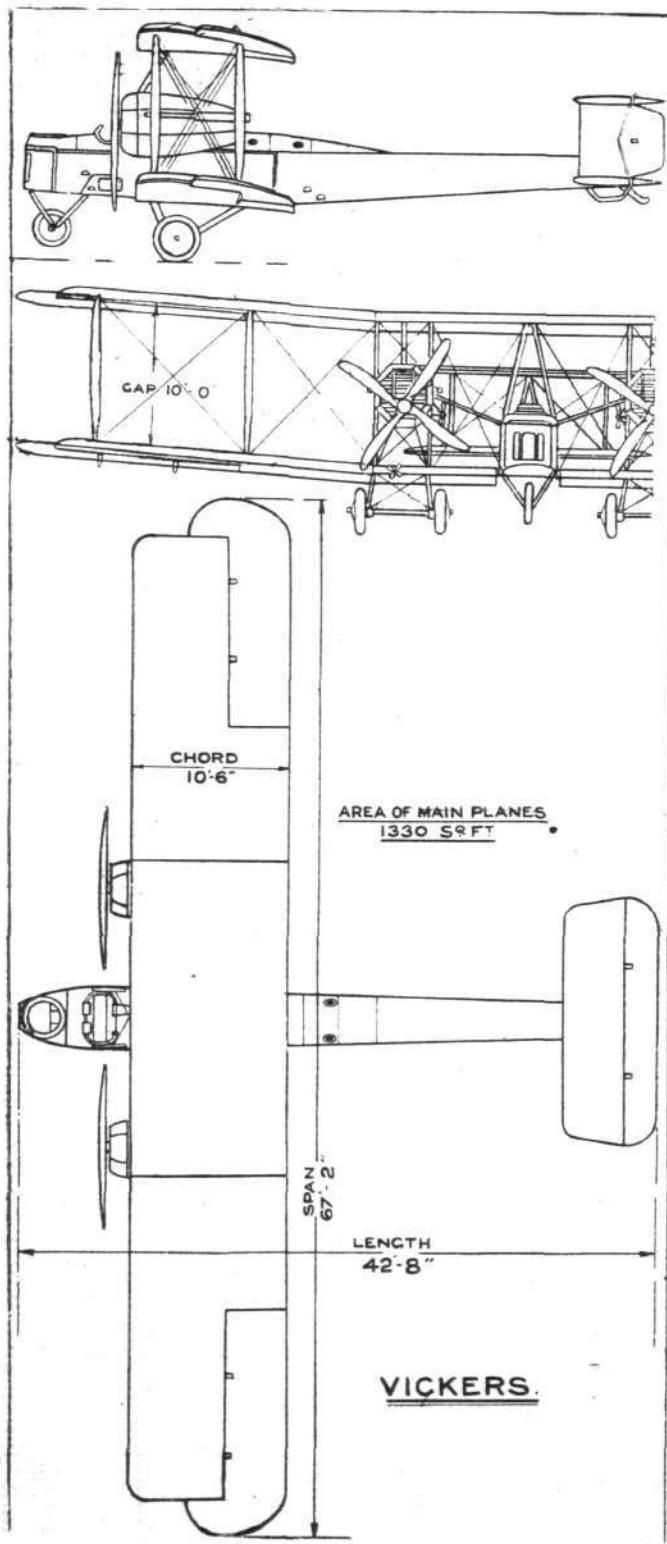
The Martinsyde-Rolls-Royce—The "Raymor"

The machine entered by Messrs. Martinsyde, Ltd., is a single-engined tractor biplane with Rolls-Royce "Falcon" engine. As the accompanying drawings and photographs

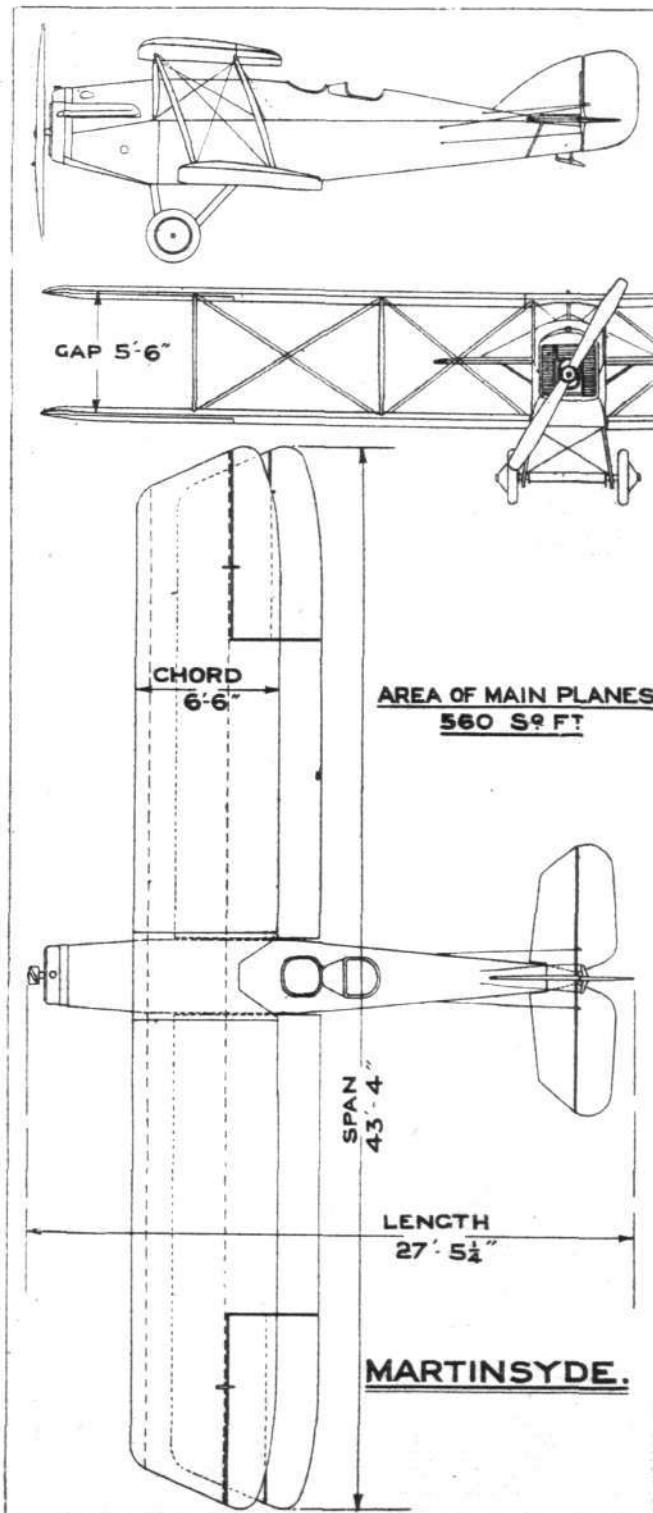
will show, the "Raymor," as the machine is called, after Mr. Raynham the pilot and Capt. Morgan the navigator, is of the same graceful, clean-cut outline as has characterised all Martinsyde machines. The pilot and navigator are seated tandem fashion, while the large fuel tanks are housed in the fuselage between the engine and the front seat. Although bearing a strong family likeness to previous Martinsyde models the "Raymor" is not, it should be pointed out, a standard type adapted for the purpose, but is a special design got out for commercial purposes. It might be mentioned that up till now this is the lowest powered machine entered for the race. As, however, Martinsyde machines have always been known for their efficiency, it may be taken for granted that the "Raymor" is no exception from the rule and if the engine is of lower power it is also of lower fuel consumption, so that probably the weight per h.p. works out as low as that of the other machines entered.

The Alliance-Napier "Seabird"

THE latest entry for the Transatlantic race is the biplane "Seabird," built and entered by the Alliance Aeroplane



THE VICKERS "VIMY-ROLLS."—Plan, side and front elevations to scale



THE MARTINSYDE-ROLLS "RAYMOR." Plan, side and front elevations to scale

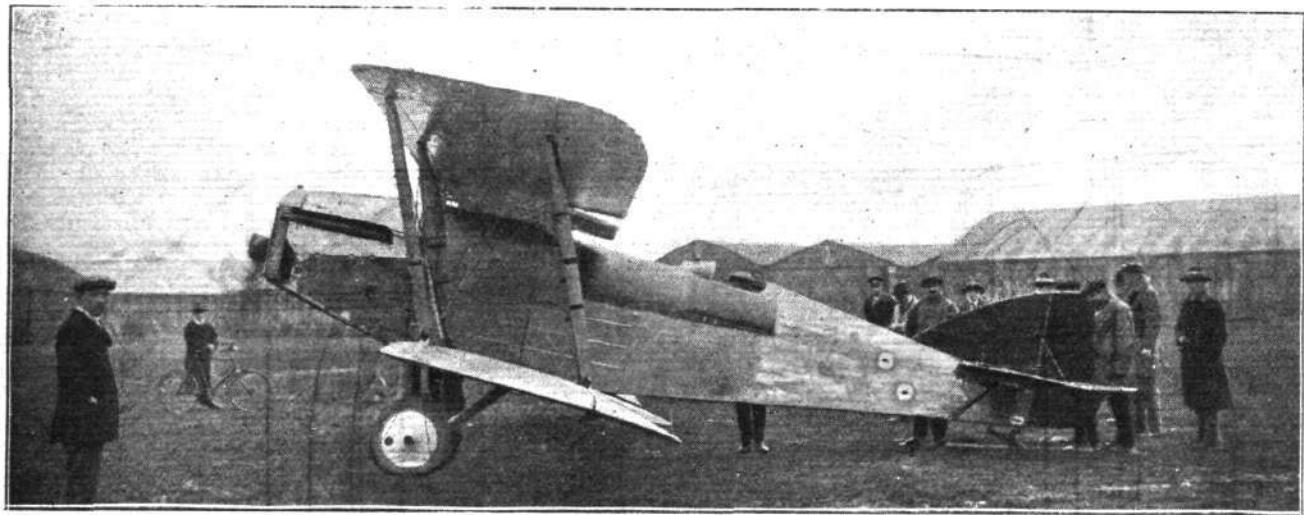


Three-quarter front view of the Martinsyde-Rolls-Royce "Raymor"

Co., of Acton and Hammersmith. This machine, which was designed by Mr. J. A. Peters, who will pilot the "Seabird," is a single-engine tractor with 450 h.p. Napier aero engine.

As the accompanying photograph well shows, both pilot

As already pointed out, the pilot will be Mr. J. A. Peters, the designer of the machine, while the navigation will be in the hands of Capt. W. R. Curtis, who will also act as assistant pilot. The main particulars of the "Seabird" are as follow:—

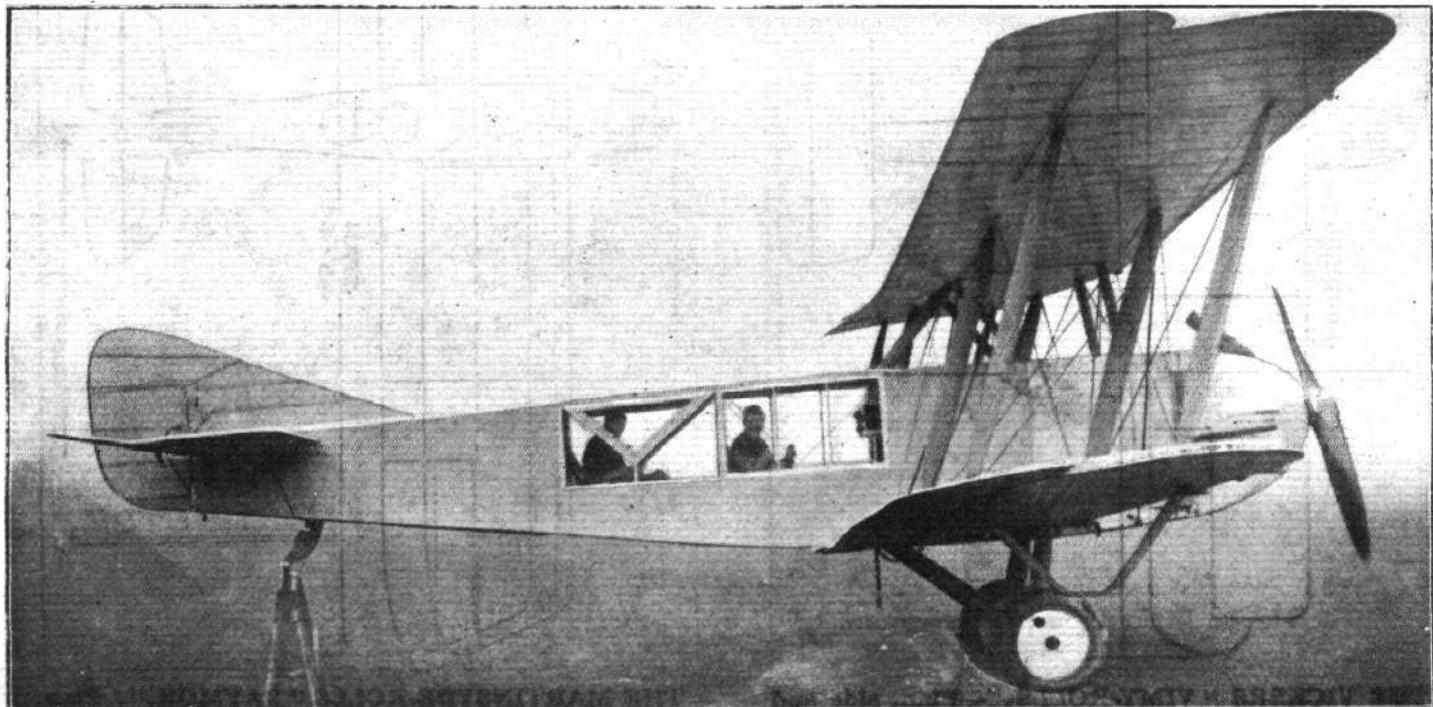


THE "RAYMOR."—Running the engine of the Martinsyde-Rolls-Royce Transatlantic machine

and navigator are enclosed in the cabin, which affords room to move about and to lie down for a brief rest. A double wireless set will be carried, one for sending and receiving messages, the other "directional" for navigation purposes. The machine is stated to have a range of about 3,000 miles.

Span, 53 ft.
Length, 33 ft. 6 ins.
Area, 700 sq. ft.
Total weight, 7,400 lbs.
Petrol, 500 gals.

Oil, 50 gals.
Range, 3,000 miles.
Max. speed, 140 m.p.h.
Landing speed, 45 m.p.h.
Engine, 450 h.p. Napier.



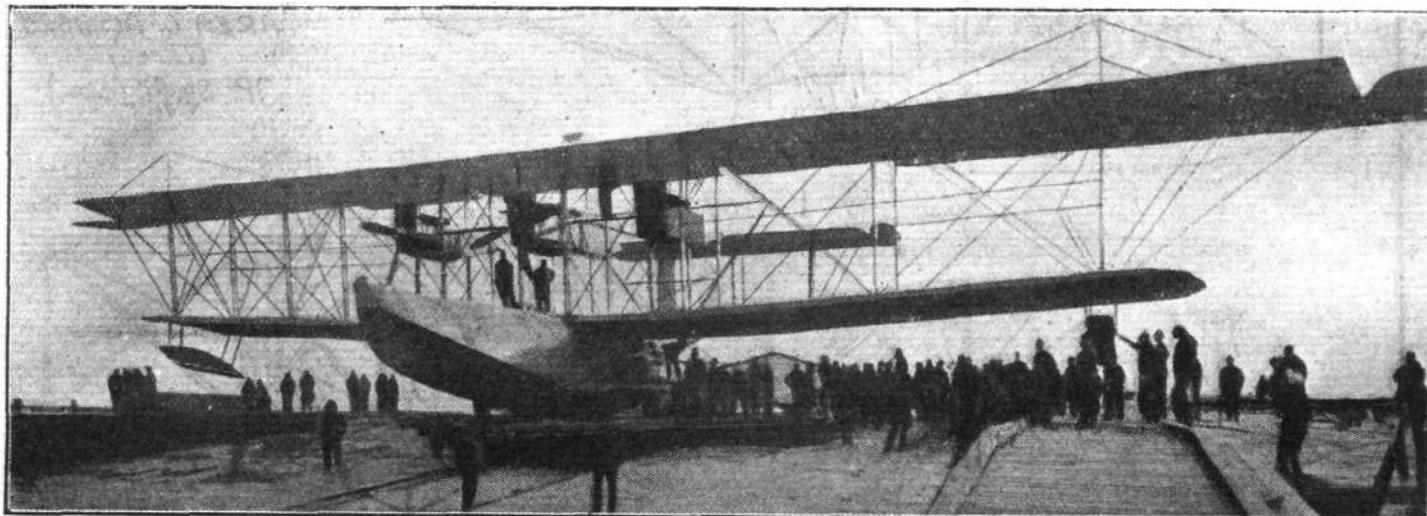
THE ALLIANCE-NAPIER "SEABIRD."—Side view, showing how both pilot and navigator are accommodated in the cabin

THE U.S. NAVY FLYING-BOAT, N.C. I

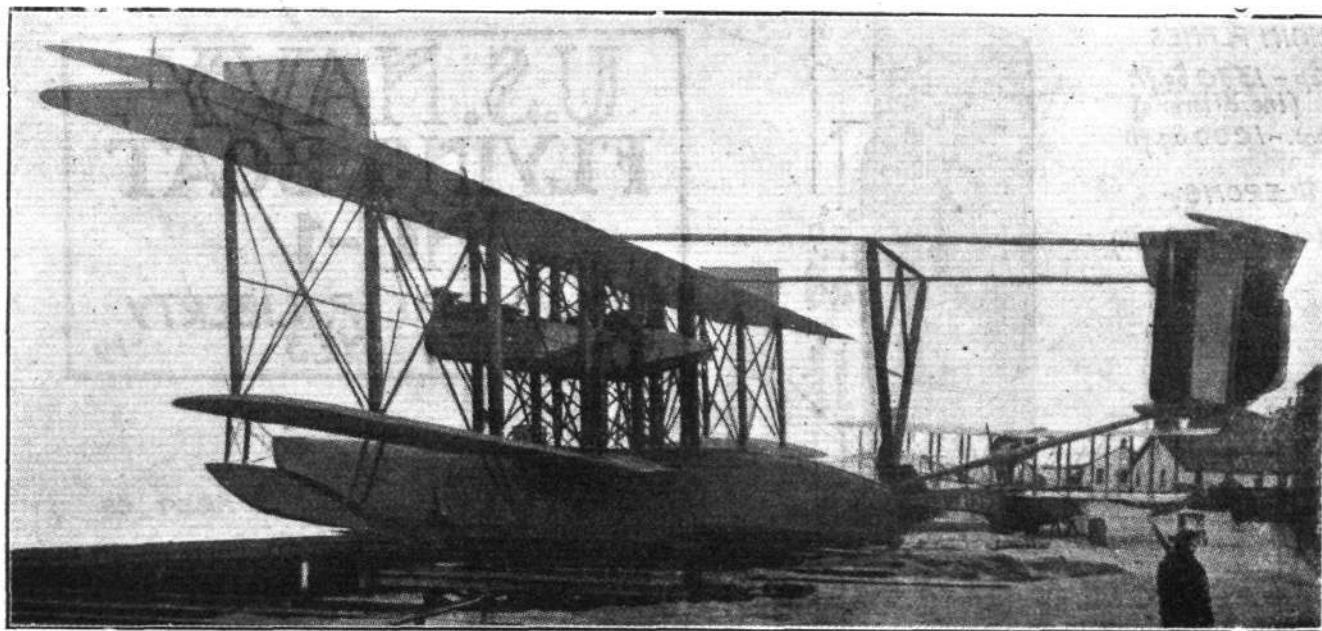
THE machines representing America (non-competitive) in the Atlantic flight are the U.S. Navy flying-boats of the N.C. (Navy Curtiss) type, built by the Curtiss Engineering Corporation, to the designs supplied by the Bureau of Construction and Repair of the Navy Department. Three of these machines N.C.-1, N.C.-2 and N.C.-3 are, we believe, all of similar type,

the engines have, we understand, been made in one or more of the Atlantic machines, such as the location of two screws as tractors and the third as a pusher.

As will be seen the N.C.-1 is a flying-boat of the short-hull type, with the tail planes carried from the hull and top main planes by means of outriggers. The hull is 44 ft. 8 $\frac{1}{4}$ ins.



Three-quarter front view of the N.C. 1 flying-boat



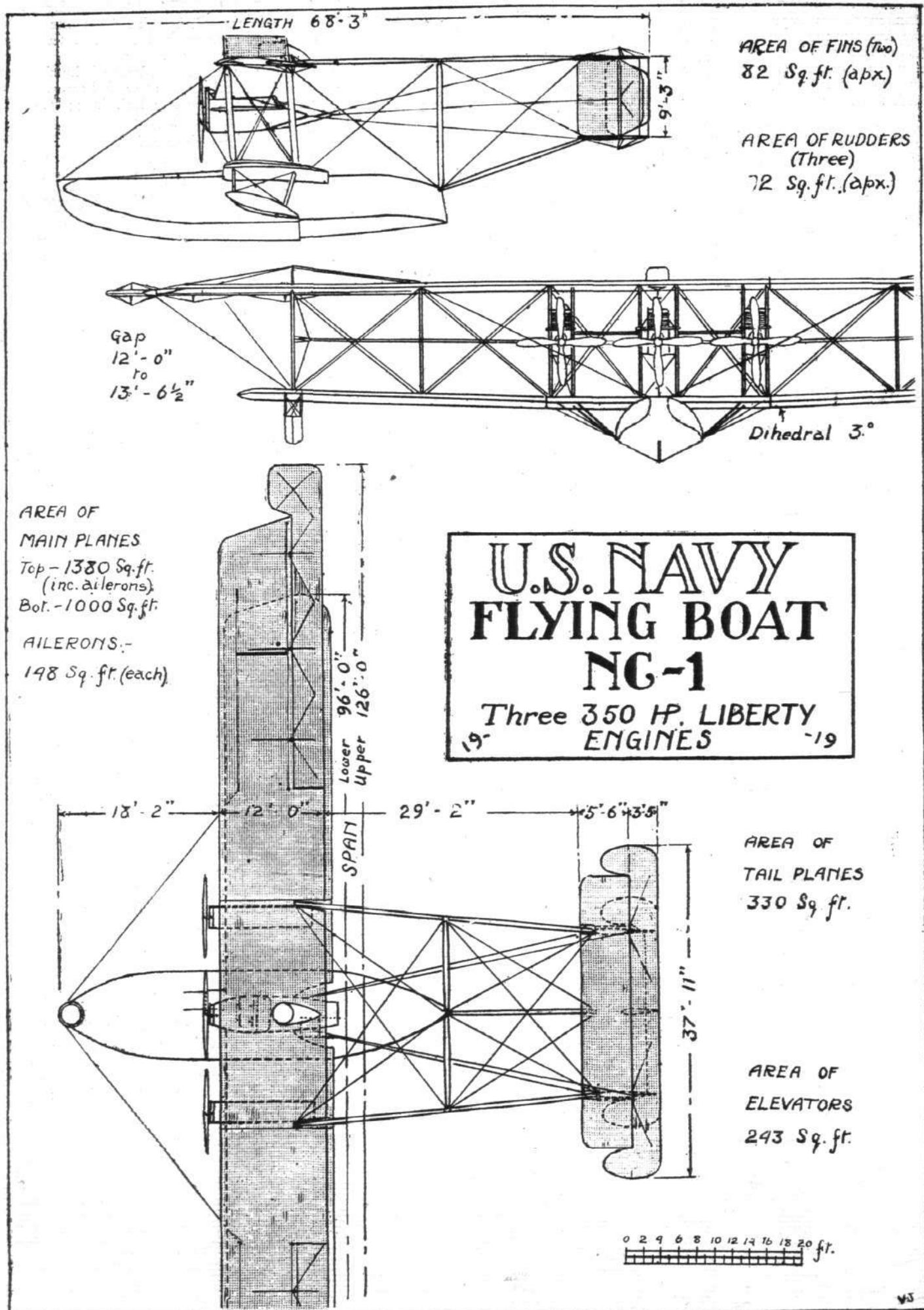
Side view of the N.C. 1 flying-boat

whilst the fourth machine, N.C.-4, differs in having four engines instead of three. The following illustrations and description of the original N.C.-1 type flying-boat should, therefore, be of general interest just now, this particular type differing from the Atlantic machines only in a few modifications rendered necessary by the requirements for the long-distance flight. Certain alterations in the arrangement of

overall length, with a maximum beam across the side-fins of about 10 ft. It has a single step 27 ft. 8 $\frac{1}{4}$ ins. from the nose, and a V bottom. The main planes are built up in seven sections, three (two outer extensions and one centre section) in the top, and four (two outer extensions and two centre sections) in the bottom. The spans of the outer sections are 44 ft. 4 ins. and 35 ft. 4 ins. for the top and bottom planes



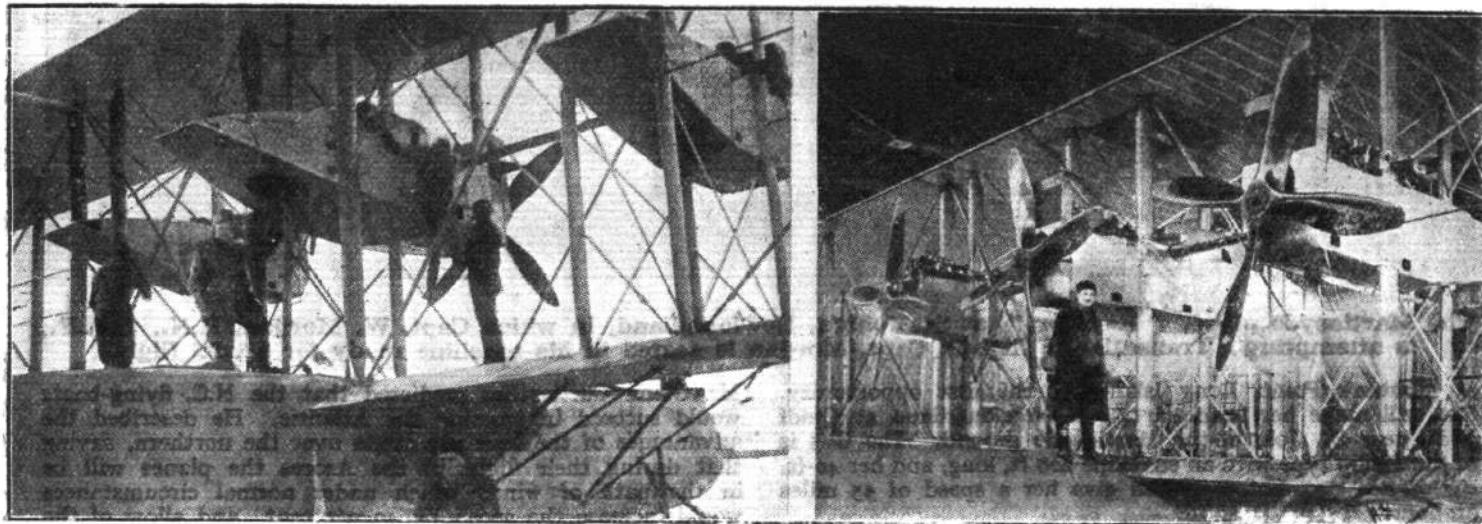
Rear view of the N.C. 1 Flying-boat



THE U.S. NAVY N.C. 1ST FLYING-BOAT.—Plan, side and front elevations to scale

respectively. The top plane centre section is 25 ft. 4 in. span, and each lower plane centre section mounted on either side of the hull is 10 ft. 8 in. span. The outer extensions of the lower plane have a 3 deg. dihedral, all other plane sections being "flat." The angle of incidence is 3 deg. top and bottom. Midway between the top and bottom planes are located the three engine *nacelles*, each supported by two pairs of interplane struts. The central *nacelle*, which is larger than the other two, contains the pilot's cockpit and control. Each

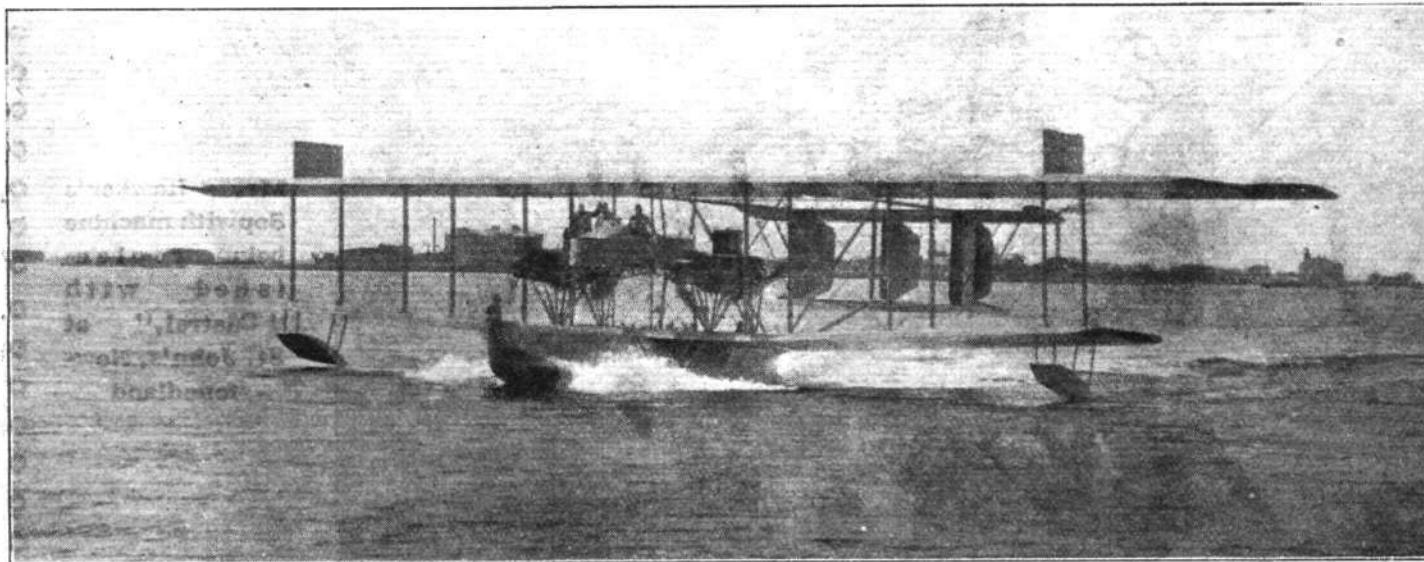
The tail is of the biplane type, carried on three hollow spruce outriggers, braced by wire cable and struts. There are three rudders mounted between the tail planes, one of which, in the centre, is balanced, and the other two being hinged to vertical panels at each outer extremity of the tail. One-piece balanced elevators are fitted to both top and bottom tail planes. The gap of the tail is 9 ft. 3 in., and the overall span of the upper and lower planes is 37 ft. 11 in. and 26 ft., respectively.



Two detail views of the power plant on the N.C. 1 flying-boat

of the outer engine *nacelles* are situated 11 ft. from the centre of the machine, and two pairs of interplane struts, located respectively 26 ft. 11 in. and 41 ft. 6 in. from the centre separate the top and bottom planes of the outer extensions. The overhang of the top plane is 15 ft. 6 in., and that of the lower plane 6 ft. 6 in. Balanced *ailerons* are fitted to the top planes only. Cockpits for the crew are provided in the nose and the centre of the hull.

The engines are of the Liberty, low compression, Navy type, developing about 350 h.p. each. The gross weight of this particular type of machine is 21,560 lb., the useful load being 7,750 lb. The speed range is about 81 to 61 m.p.h., and climb 2,000 ft. in 10 min. It was one of these machines that, in November last, carried 45 passengers in addition to a crew of five at Rockaway, N.Y., and also flew from New York to Washington with a crew of five and ten passengers.



One of the four-engined "Atlantic" N.C. flying-boats just taking off

TRANSATLANTIC FLIGHT ITEMS

Messrs. Boulton and Paul of Norwich have officially entered a second machine for the *Daily Mail* Transatlantic flight, in continuance of their policy to take every possible precaution to ensure against failure, and it will be in readiness to take up the flight in event of any breakdown or accident to "Boulton-Paul First." Both machines will be shipped together for the start from Newfoundland, and if only the one is required to make the flight the other may go on a tour of Canada or America. The names of pilots and crew of both machines will probably be announced shortly. This second entry is exactly the same type of machine as Messrs. Boulton and Paul entered some weeks ago, *i.e.*, a twin-engined biplane fitted with "Napier Aero" engines.

The R.A.F. flying-boat is to start from Cape Broyle Harbour about 30 miles south of St. John's.

Three of the American flying-boats, NC 1, NC 3, and NC 4 left Rockaway, N.Y., on May 8, and the first two reached Halifax safely. The NC 4, however, had to descend, off the coast of Maine, owing to engine trouble. The NC 1 and NC 3 flew to Trepassey Bay, Newfoundland, on Saturday. It is stated that the engines of NC 1 were so hot she could not have flown another hundred miles, while the NC 3 had to return to Halifax owing to trouble with a propeller, but she made the journey later.

The United States dirigible, C 5, has been detailed to accompany the flying-boats, and she is to leave her station



The Martinsyde plane, "Raymor," at St. John's, Newfoundland, in which Capt. W. Morgan, R.N., R.A.F., is attempting a Transatlantic flight. Capt. Morgan is seated in his machine ready for a trial flight

at Montauk Point, Long Island, at the first opportunity. She will make her headquarters in Newfoundland at Quidi Vidi, near St. John's, the Martinsyde ground. The C 5 is of the Blimp type with an envelope 200 ft. long, and her 40-ft. car carries two motors, which give her a speed of 55 miles an hour.

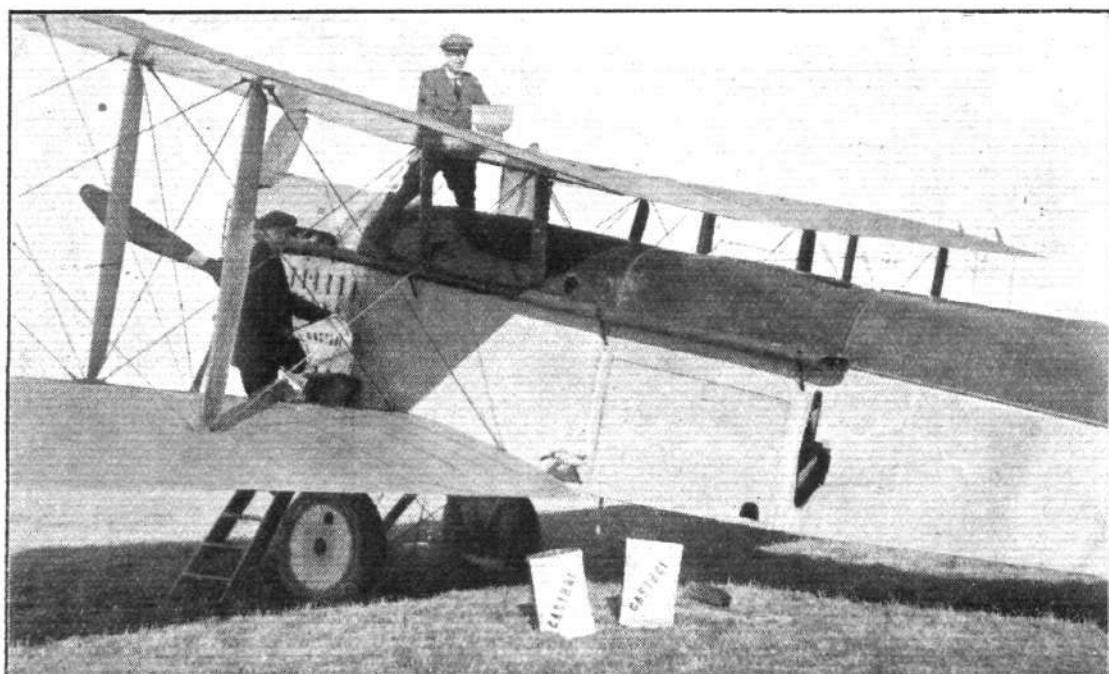
The s.s. "Digby," with the Handley Page-Rolls-Royce on board, arrived at St. John's on May 10. The cases containing the parts of the machine were at once loaded on to a special train and taken to Harbour Grace, where the work of assembling the giant was immediately commenced.

The Americans have 27 destroyers stationed between Newfoundland and the Azores, and five battleships, five cruisers, and two tankers between the Azores and Portugal.

Mr. Glenn Curtiss has predicted that the N.C. flying-boats would succeed in crossing the Atlantic. He described the advantages of the southern route over the northern, saying that during their flight to the Azores the planes will be in the path of winds which under normal circumstances would increase the speed by 40 per cent., and allow of the flight between Trepassey and the Azores to be made in 20 hours.

At a luncheon at Atlantic City on Saturday, Gen. Charlton stated an attempt would be made this month to cross the Atlantic with the R. 34.

In connection with the additional prize of 2,000 guineas for the Transatlantic flight, we are asked to make it clear that this has been offered by the proprietors of "State Express" cigarettes.



Mr. Hawker's Sopwith machine being replenished with "Castrol," at St. John's, Newfoundland

U.S. and the Aviation Industry

It is announced by the War Department that orders will be placed for new airplanes to prevent a collapse of the airplane manufacturing capacity built up during the War. Machines to be ordered will be of advanced types developed from War experience, and designed by engineers working under conditions more favourable than existed before the War.

The War Department also announces the abandonment of ten flying fields, whose surplus equipment will be stored in the fields to be retained.

Acting Secretary of War Crowell announced that the United States is taking no active part in the work of the International Commission at Paris, which is standardising air rules, signals of navigation, and marks for flying fields.



Aerial Mails in South America

THE first regular aeroplane mail service to be maintained in South America is that which operates between Santiago and Valparaiso—the two main centres of population in the Republic of Chile. The Chilian railway system is notoriously lethargic, so that the journey between the two cities occupies some three hours, excluding a wait for half-an-hour or so which is the invariable rule at the half-way junction of Llay-Llay. For the new mail-carrying service, which has been in successful operation for some weeks, a number of the Bristol monoplanes which were recently presented by the British to the Chilian Government, are employed, and we understand that the Chilian pilots have proved particularly fitted for the work in hand.

METEOROLOGY AND TRANSATLANTIC FLIGHT

By A. ZAIMAN, B.A., F.R.Met.Soc.

THE problem of crossing the Atlantic by air has for a long time engaged the attention of experts, and this has naturally been more immediately stimulated by the *Daily Mail* £10,000 competition. Some of the attempts are of the nature of a dash across; others, however, are more in the nature of serious efforts to tackle the problem scientifically. The idea of a daring dash across appeals to our sporting instincts, but it is the serious attempts which will be of great utility in the future. While the inherent mechanical difficulties of the machine seem to have been overcome, the scientific

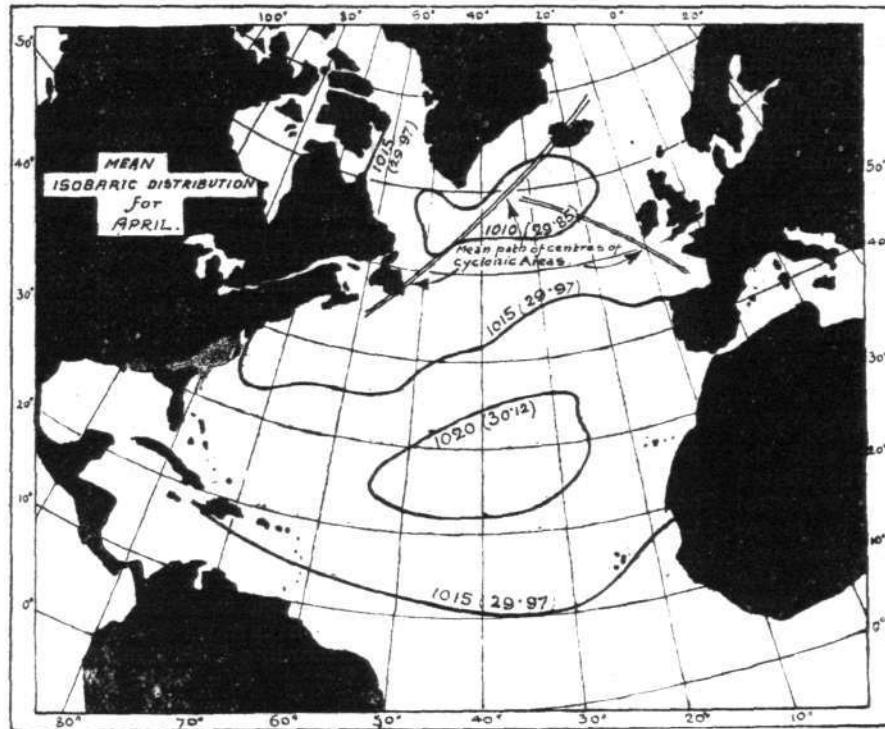
pressure he draws which are indicative of the pressure distribution, and so of the wind distribution; the distribution of temperature and weather can also, in part at least, be related to them. It is from this map, then, that the conclusions are drawn upon which the forecasts are based. A modern meteorologist thinks in maps—this is a fundamental point—his language and forms of expression are “map-coloured.”

Let us first consider what we can learn from the study of a single map. The relation wind bears to pressure is one thing we can discover. It will be observed in any weather

map that the arrows which denote the wind generally take account of the run of the isobars in a peculiar manner. They just fail to point along the isobars, with a certain sort of regularity. Looking along an arrow from feather to tip, it deviates from the line of the isobar so that it points from the high pressure to the low. This is a statement of Buys-Ballot's in one form. We can, however, look at this law in a somewhat different way, and in one which will be found more useful to our present purpose. Considering the wind as a flow of air along the surface, we see that air flows along the isobars round the high pressure on the right or the low pressure on the left, but with a drift across the isobars from high pressure to low pressure that gives the direction of the wind a deviation from the isobars. Recent investigations of upper winds have shown that the upper air flows more strictly along the isobars, so that this characteristic drift of surface winds is perhaps attributable to ground friction. At a height of 1,500 ft. the wind is practically along the isobars, and so at this height we approximately get the geostrophic wind (as it is called). The important point is then that we know the direction of the wind at this height from our knowledge of the surface distribution, and its strength can be ascertained from the closeness with which the isobars lie together.

These investigations have further shown us that there is a gradual increase of wind strength the higher we get, and the wind is generally unaltered in direction. Knowing the surface distribution, therefore, we can to some extent get a probable estimate of the upper winds when no further data are available.

The forecaster's skill, however, depends on a close study of a succession of maps, so we will next consider what can



difficulties of navigation still remain. It is the purpose of this article to draw attention to what help in this connection is provided by meteorology.

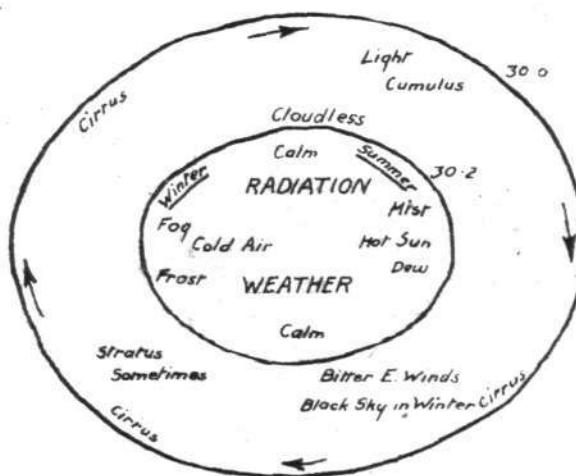
Anything that savours of prophecy is always regarded with suspicion, so as the use of meteorology for navigation purposes lies to a great extent in the possibilities of forecasting wind and weather, it will be advisable to review briefly the general principles underlying our weather-science. The



WEATHER in a CYCLONE

scope and limitations of modern meteorology will then be clear, and its great helpfulness apparent.

Modern meteorology does not comprise simply a wonderfully gifted individual expert. It demands an organised co-operation of many persons, who, acting as simultaneous observers, record the climatic conditions of their particular locality, and then transmit their reports by telephone or telegraph to one centre where the meteorological expert charts them on a map. It is the lines of equal barometric



WEATHER in an ANTI-CYCLONE

be learnt from such a sequence. The variety of isobaric forms is manifest, and these forms can be classified. We need only treat two of the forms, cyclone and anticyclone. The former is a region of low pressure, the pressure rising as we pass outwards from the centre; the latter is a region of high pressure, changing to low as we go from the centre; in both cases the isobars are approximately circles. The anticyclone is much the meeker of the two brethren; it is the cyclone which is at the basis of weather changes. The

fundamental point is that there is a typical weather associated with each of the two forms (see the accompanying figures). What the meteorologist does, therefore, is to study the paths of the cyclonic centres, and from recorded barometric tendency and the veering or backing of the wind he can ascertain what path a particular cyclone is taking. On that his forecast depends. Consider, for example, what happens when a cyclone approaches a certain locality. First there is a blue sky; as the barometer begins to fall cirrostratus cloud, with probably a halo, makes its appearance, gradually becomes lower and denser, and forms an overcast sky.

The temperature rises, and the air feels muggy and close. As the centre of the depression approaches, rain sets in, and continues till the barometer turns to rise. The passage of the trough is often associated with a squall or heavy shower, commonly known as a "clearing shower." Immediately the air becomes cooler, losing the former muggy sensation, and soon patches of blue sky appear. The shift of the wind is different in the right-hand portion of the depression from what it is in the left-hand portion. In the former, on its first approach, the wind "backs" to south or south-east, and as the depression passes along gradually "veers" to south-west and west, with increasing force. In the left-hand side of the depression the wind "backs" right round from south to south-east, and then on to east, north-east, north, and finally north-west, when it gradually abates and the weather becomes fine. The direction of the wind, and consequently the accompanying weather, depend upon whether



Music from the Air

NEW YORKERS who crowded the Victory Way, New York, during the recent campaign in connection with the Victory Loan, were regaled by music played on the United States dirigible, C 4, and transmitted by wireless for several miles through the air, finally being reproduced by megaphonic transmitters. The dirigible ascended from the naval station at Rockaway Point, and soared over the city. The music was caught at the wireless station, and made a short lap over a wire to the "Victory Way," where more than 100 sound amplifying instruments made the music audible to many thousand persons.

This method was also employed for reading President Wilson's Victory Loan message from an aeroplane 2,600 ft. in the air to 15,000 persons assembled on the steps of the Treasury Building at Washington.

An Hotel Air Service

IN connection with the Pan-American Aeronautic Exposition, the Hotel Traymore at Atlantic City has arranged to bring its guests from their homes by aeroplane. Having

the depression passes to the north or south of the particular locality we are considering.

What the forecaster does then is to prognosticate the probable future positions of the isobars, and base his forecast thereupon. Let us turn now to the particular question of North Atlantic conditions in regard to a flight across.

Our knowledge of upper winds is very scanty, so everything depends on the surface observations. A close study of daily-synchronous charts has to be made, so that the mean general barometric trend for any month can be ascertained (example, figures for April). From cabled surface observations the distribution is known at any time, and the forecasting is then a matter of applying the principle outlined in the foregoing. The probable upper winds can be ascertained from a calculation of the geostrophic winds based on surface data (on land, of course, pilot-balloon ascents can be made and the winds determined exactly). It is possible to foresee conditions under which fine weather for a passage can be guaranteed.

To succeed in making the flight at all, is dependent on a choice of a suitable day, and this demands careful forecasting. But to organise a Transatlantic air service requires much more elaborate knowledge, and offers a wide field for meteorology; for example, in settling what different routes are advisable for different times of the year. It is to be hoped that a big advance will soon be made, so that the aerial service of the future will be as reliable as the steamship service of to-day. Meteorology will allow of ease of transport, and transportation is synonymous of civilisation.



purchased two aeroplanes, the proprietors of the hotel will maintain a service between the two cities, thus starting the first hotel air service in the world.

The two machines, which made the first trip on May 3, accomplished the journey in half an hour, landing safely on the beach immediately in front of the hotel.

A Memorial to Americans

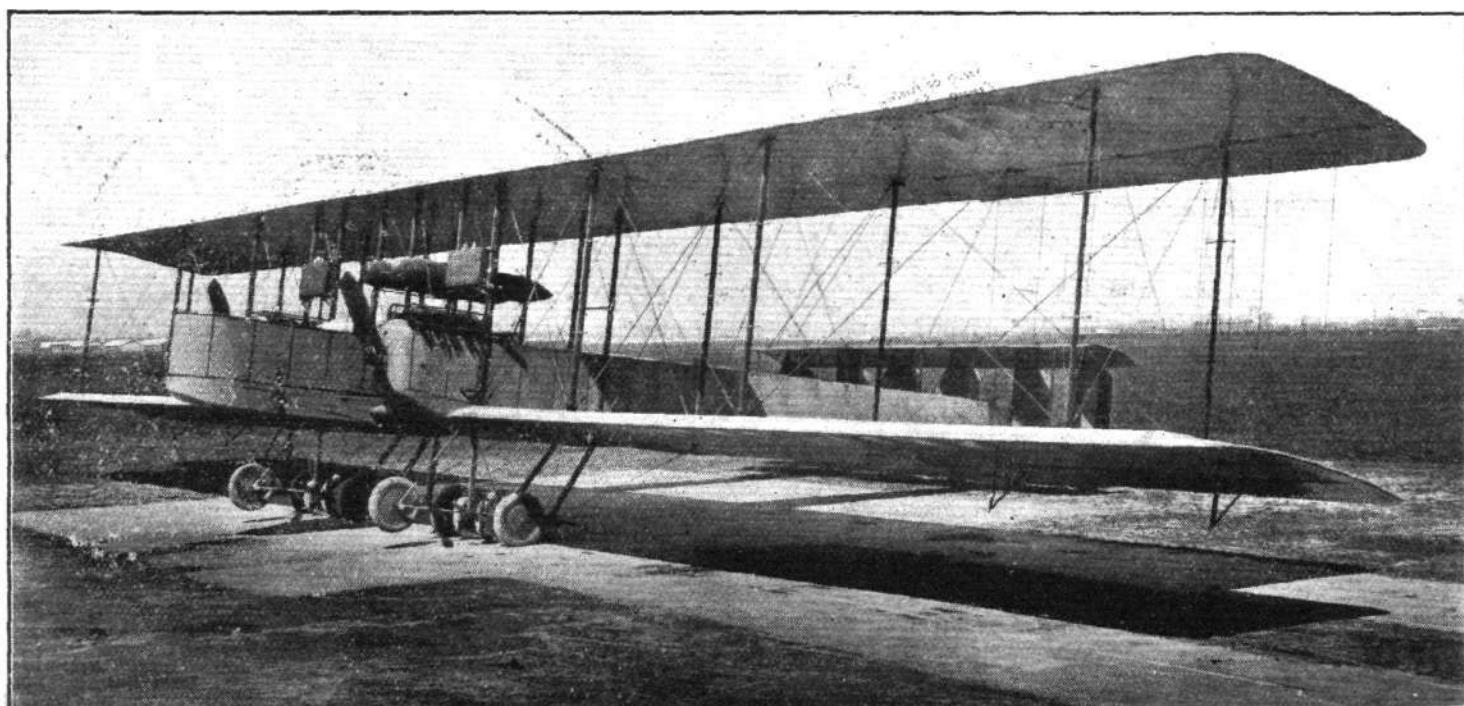
IT is stated that shortly there will be placed in the Lafayette National Park a bronze eagle in memory of all the aviators of America who lost their lives in the world-war, and below will be a bronze tablet recording their names. It is to be known as "Honor Crag."

Aeroplanes and Police Work

FROM Atlantic City, Wyoming, comes the news that on May 6 a wireless message from a police aeroplane led to the prompt and successful pursuit of a motor-car thief.

Aerial Services in Sweden

A COMMITTEE has been appointed by the Swedish Government to inquire into the steps to be taken to establish a regular aerial service.



One of the first giant bombing 'planes built for Italy by the S.I.A. Co., of Turin, in the early part of 1916. It had two 700 h.p. Fiat engines mounted in the forward portions of the twin fuselages. The central nacelle carried pilot, observers and bombs, the useful load being 3 tons. Span, 108 ft. ; chord, 11 ft. 6 ins. ; overall length, 57 ft. ; and weight, empty, 5½ tons

DRAWING OFFICE DATA

By E. O. WILLIAMS, B.Sc.Eng. (Lond.), Assoc. M. Inst. Civil Engineers, Assoc. Fellow R.Ae.Soc.G.B.
(Concluded from page 599.)

VI.—THE NEWALL STANDARD TABLES OF LIMITS.

IT IS, of course, well known that in engineering certain limits have to be imposed to insure accuracy and to make provision for the proper fitting together of two or more parts. *Absolute* accuracy is not humanly possible, and some limit must of necessity be put to the amount by which a certain article may differ in size from that called for in the specification. This margin, providing for what is considered in modern practice reasonable error in workmanship,

is usually termed *Tolerance*, while the necessary difference in the sizes of two pieces that have to go together is known as *Allowance*. Fig. 38 is a table of these *Tolerances* and *Allowances*, collectively termed limits, and are known as the Newall Standard Tables of Limits, which are employed in aircraft construction. These tables will be self-explanatory, and do not, I think, require any comment.

VII.—ON PLOTTING GRAPHS OF WING SECTION DATA.

In an aircraft firm intending to build machines of their own design, it is a matter of the greatest importance that some degree of uniformity should be established and maintained in the matter of planning out the various types of machines which it is intended to build. As the choice of a suitable wing section for the purpose in view is of paramount importance, it would be well to decide beforehand on some systematic method of plotting curves of the lift coefficient, L/D ratio, travel of the c.p., etc., for all the wing sections of which these data are available, so as to have always ready at hand all the particulars required for purposes of design. In deciding on the form these records are to take, it should be kept in mind that their primary object is to facilitate the choice of the section giving the best results for the particular purpose aimed at, and that, therefore, the method

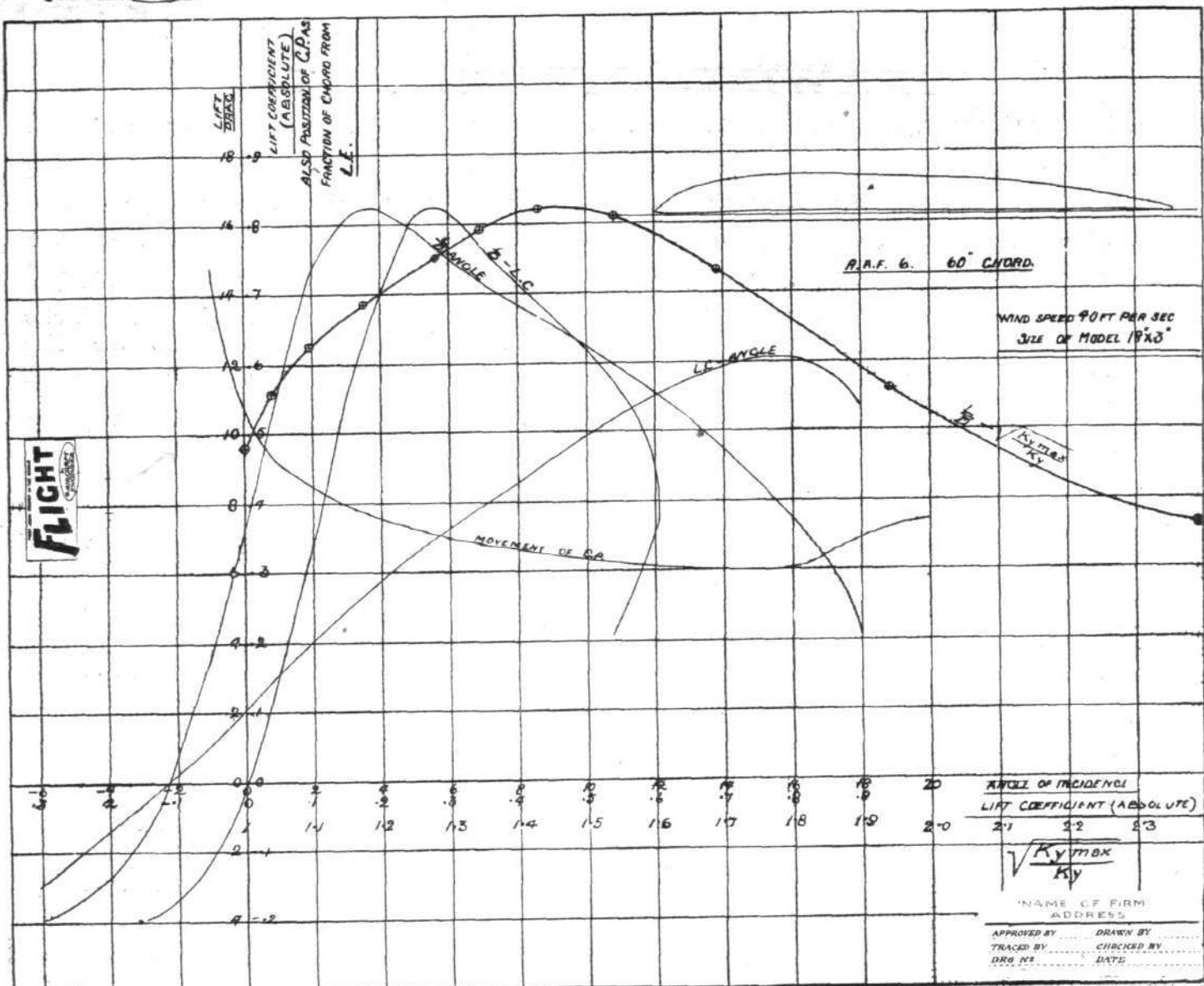
which combines the easiest comparison with full particulars will be the most convenient for this purpose.

There are in general use several methods of plotting wing section data. Thus, we have the Eiffel method, which is, I believe, pretty generally used in France. In this country the N.P.L. system has been generally adopted, although alternative systems have been suggested. For example, Mr. Handley Page, in his lecture before the Aeronautical Society, entitled "The Case for the Large Aeroplane," outlined a method which lent itself better to a comparison of different wing sections than the systems more generally employed.

In Fig. 39 is shown a method of plotting wing section data evolved by the writer, which he has found in practice to answer the requirements of the

| TOLERANCES IN STANDARD HOLES (CLASS A AND B) | | | | | |
|--|-----------------------------|-----------------------|------------------------|------------------------|----------|
| FORCE FITS (CLASS F) | ALLOWANCES FOR VARIOUS FITS | | | | |
| NOMINAL DIAMETERS | UP TO $\frac{1}{2}$ " | $\frac{9}{16}$ " - 1" | $1\frac{1}{16}$ " - 2" | $2\frac{1}{16}$ " - 3" | |
| HIGH LIMIT | + .00025 | + .00050 | + .00075 | + .00100 | + .00150 |
| LOW " | - .00025 | - .00050 | - .00075 | - .00100 | - .00150 |
| TOLERANCE | .00050 | .00100 | .00150 | .00200 | .00250 |
| HIGH LIMIT | + .00050 | + .00100 | + .00150 | + .00200 | + .00250 |
| LOW " | - .00050 | - .00100 | - .00150 | - .00200 | - .00250 |
| TOLERANCE | .00100 | .00150 | .00200 | .00250 | .00300 |
| DRIVING FITS (CLASS D) | | | | | |
| NOMINAL DIAMETERS | UP TO $\frac{1}{2}$ " | $\frac{9}{16}$ " - 1" | $1\frac{1}{16}$ " - 2" | $2\frac{1}{16}$ " - 3" | |
| HIGH LIMIT | + .00100 | + .00200 | + .00400 | + .00600 | + .00900 |
| LOW " | - .00100 | - .00200 | - .00400 | - .00600 | - .00900 |
| TOLERANCE | .00200 | .00400 | .00600 | .00800 | .01000 |
| PUSH FITS (CLASS P) | | | | | |
| NOMINAL DIAMETERS | UP TO $\frac{1}{2}$ " | $\frac{9}{16}$ " - 1" | $1\frac{1}{16}$ " - 2" | $2\frac{1}{16}$ " - 3" | |
| HIGH LIMIT | + .00050 | + .00100 | + .00150 | + .00200 | + .00250 |
| LOW " | - .00050 | - .00100 | - .00150 | - .00200 | - .00250 |
| TOLERANCE | .00100 | .00150 | .00200 | .00250 | .00300 |
| RUNNING FITS (CLASS R) | | | | | |
| NOMINAL DIAMETERS | UP TO $\frac{1}{2}$ " | $\frac{9}{16}$ " - 1" | $1\frac{1}{16}$ " - 2" | $2\frac{1}{16}$ " - 3" | |
| HIGH LIMIT | + .00100 | + .00225 | + .00425 | + .00625 | + .00825 |
| LOW " | - .00100 | - .00225 | - .00425 | - .00625 | - .00825 |
| TOLERANCE | .00200 | .00450 | .00750 | .01050 | .01350 |
| HIGH LIMIT | + .00075 | + .00100 | + .00125 | + .00150 | + .00175 |
| LOW " | - .00075 | - .00100 | - .00125 | - .00150 | - .00175 |
| TOLERANCE | .00150 | .00200 | .00250 | .00300 | .00350 |
| HIGH LIMIT | + .00050 | + .00075 | + .00100 | + .00125 | + .00150 |
| LOW " | - .00050 | - .00075 | - .00100 | - .00125 | - .00150 |
| TOLERANCE | .00100 | .00150 | .00200 | .00250 | .00300 |
| THE NEWALL STANDARD TABLES OF LIMITS | | | | | |
| APPROVED BY | NAME OF FIRM | ADDRESS | | | |
| DRAWN BY | | | | | |
| CHECKED BY | | | | | |
| DRG. NO. | | | | | |
| DATE | | | | | |

Fig. 38.
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| MACHINE N ^o | TYPE | ENGINE | TOTAL WEIGHT. = 76 | | | | | AREA OF MAIN PLANES = sq ft | | | WING SECTION. | | | |
|------------------------------|-------------------------|-------------------------|--------------------|----------------|--------------------|---------|-------------------------------|---------------------------------|----------------|-----------------|---------------|--------------|--------------|---------------|
| | | | ANGLE OF INCIDENCE | K _y | V ² mph | V m.p.h | K _y K _x | TAIL PLANE ANGLE TO MAIN PLANES | K _x | DRAG 16 SQ. FT. | TAIL RESIST. | WING RESIST. | BODY RESIST. | TOTAL RESIST. |
| | | | -2° | | | | | | | | | | | |
| | | | -1° | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 1° | | | | | | | | | | | |
| | | | 2° | | | | | | | | | | | |
| | | | 3° | | | | | | | | | | | |
| | | | 4° | | | | | | | | | | | |
| | | | 5° | | | | | | | | | | | |
| | | | 6° | | | | | | | | | | | |
| | | | 8° | | | | | | | | | | | |
| | | | 10° | | | | | | | | | | | |
| | | | 12° | | | | | | | | | | | |
| | | | 14° | | | | | | | | | | | |
| | | | 16° | | | | | | | | | | | |
| | | | 18° | | | | | | | | | | | |
| | | | 20° | | | | | | | | | | | |
| REMARKS | | | | | | | | | | | | | | |
| FLIGHT AIRCRAFT ENGINEERS | | | | | | | | | | | | | | |
| NAME OF FIRM ADDRESS | APPROVED BY DRAWN BY | TRACED BY CHECKED BY | DATE | | | | | | | | | | | |

Fig. 40.
644

| MACHINE NO. | | NAME OF FIRM ADDRESS | | PROJECTED SIDE AREA. SQ FT | | DIRECTIONAL STABILITY. DISTANCE OF C.G. BEHIND NOSE. FT | | | | | |
|-------------|--------|-------------------------|----------|-------------------------------|------------|---|---|-----------------------------------|--|-------------------------------------|---------|
| TYPE | ENGINE | APPROVED BY | DRAWN BY | TRACTED BY | CHECKED BY | ANGLE OF YAW | YAWING MOMENT DUE TO TOTAL LATERAL FORCE COEFFICIENT IN LBS | C.P. OF C.P. BEHIND NOSE | DISTANCE OF C.G. TO C.G. IN FEET | DISTANCE ABOUT C.G. IN LBS FT | REMARKS |
| | | | | | | 18 | | | | | |
| | | | | | | 20 | | | | | |
| | | | | | | 25 | | | | | |
| | | | | | | 30 | | | | | |
| | | | | | | 35 | | | | | |
| REMARKS | | | | | | | | | | | |

Fig. 41.

designing office admirably. As will be seen from Fig. 39, curves have been plotted of L/D ratio, lift coefficient, and travel of c.p. against a base of angles of incidence; L/D ratio to base of lift coefficient (absolute), and finally a curve of L/D (or K_y/K_x) to a base of $\sqrt{\frac{K_y \text{ max.}}{K_y}}$.

The following notation will be employed: L = load in lbs./square feet of wing area; K_y = lift coefficient (absolute) at any speed V; $K_y \text{ max.}$ = maximum lift coefficient of wing considered; V_l = landing speed.

We then have: $L = K_y \times V^2$, and also $L = K_y \text{ max.} \times V_l^2$ $\therefore K_y \times V^2 = K_y \text{ max.} \times V_l^2$; and $\frac{V^2}{V_l^2} = \frac{K_y \text{ max.}}{K_y}$ or $V_l = \sqrt{\frac{K_y \text{ max.}}{K_y}}$.

VIII.—STANDARD TABLES OF PERFORMANCE.

When a number of different types of machines are designed, it is a good plan to tabulate all the available data relating to the aerodynamical qualities of each type, as the majority of such data will be required in the first instance for plotting curves of calculated performances, while later on they will form a valuable record and help to indicate to what extent the actual performance tallies with the calculated one. Also it aids in indicating the effect on the general performance curves of any alteration in detail data which could not be traced from the curves. A table as that shown in Fig. 40 will be found convenient for recording the necessary particulars.

In addition to data of performance it is often useful to tabulate—where the necessary information is available, which is admittedly not always the case

Thus, it will be seen that by plotting L/D (or K_y/K_x) to base of $\sqrt{\frac{K_y \text{ max.}}{K_y}}$ we obtain curves which compare various wing sections for same landing speed. In Fig. 39 this curve has been plotted for the wing section known as R.A.F.6. By plotting similar curves for other sections on tracing cloth, the tracings can be placed one on top of the other, and the curves easily compared. It is a good plan to draw, on the same tracing as the curves, the wing section to scale.

It will be seen from Fig. 39 that the L/D is a maximum when $\sqrt{\frac{K_y \text{ max.}}{K_y}}$ equals, approximately, 1.5. That is for a landing speed of 45 m.p.h., the wing section is most efficient at a speed of $1.5 \times 45 = 57.5$ m.p.h. This method of plotting enables a selection to be made of the best wing for any particular speed.

—figures relating to the stability of a machine. Such a table—for yawing moments—may conveniently be set out as indicated in Fig. 41, while similar tables can be got out for rolling and pitching stability, employing, of course, appropriate data. Much of the information on which such tables are based must necessarily be provided chiefly by wind tunnel tests on scale models, and it appears probable that as time goes on, firms designing their own machine will make use of the wind tunnel to a greater and greater extent, since this forms one of the cheapest and most reliable ways of obtaining a check on figures arrived at by calculations. This will be especially so when more knowledge has been gained of the allowances to be made when applying results of model tests to full-size machines.



THAT Cleopatra's Needle on the Thames Embankment was not "lowered" through the visits of the Hun Goths to London, is nothing short of a miracle. As it is, there are sundry raider scars much in evidence on the bronzed Sphinxes at the base of the monument. These are to remain as a public record of the beastliness of the Hun's methods, the London County Council having decided not to obliterate them. The more items of reminder of this description throughout the country, the better.

AFGHAN revolutionaries are credited with having the wherewithal to carry on an active campaign in the air and by means of armoured cars on the Indian frontier. This is but an instance of how war by aircraft has taken hold of the minds of the peoples of all nations. Moreover, it is once more a warning as to the ease with which fleets of aircraft can be secretly acquired or built and held in reserve against emergency. What may be, and probably is, in the minds of the Hun in this direction for the coming future, it is not difficult to measure, and the dissatisfaction of Marshal Foch upon this point in the terms of Peace is likely to be remembered by the next or following generation. In the meantime, it is good hearing to learn that *our* pilots are not behindhand in taking a hand in demonstrating to the Afghans the practical use of aircraft in border warfare.

THERE is to be a reconstruction of an air-raid over London in one of the latest cinema films to be completed. This will be seen presently in Miss Mary Marsh Allen's film, "Forgive Us Our Trespasses." We're just wondering whether part of the *motif* of this "play" may aim at defining the "rights" and wrongs of the ownership of the air above. The Huns, anyway, were pretty violent trespassers.

PRAIRIE flying looks like being a sport having possibilities in the not too far distant future, following the application of the Canadian Pacific Railway for an Air Charter, enabling this great corporation to enter the aerial field of enterprise.

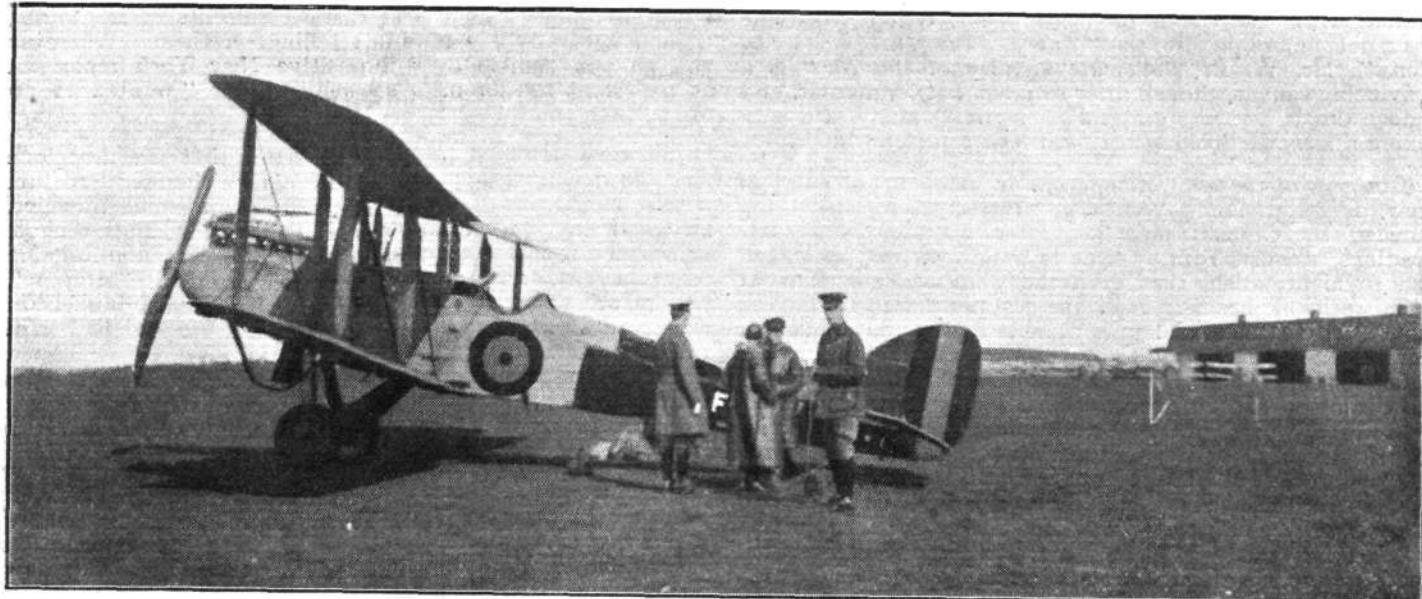
Mr. Grant Hall, the Vice-President, is a great enthusiast upon the subject, having regard to the phenomenal development of flying, especially amongst Canadians. Natural landing-places abound on the prairies, according to Mr. Hall, "where there are wide spaces with almost complete absence of the airmen's real enemy: mist and fog, not wind. There, air travelling might be profitable."

MORE trouble at the London aircraft factories again. And again it is the same old stunt in which the inefficient and shirking workman seeks to saddle his legitimate share in this world's toil by striking for payment by time, against payment by results. "That's the stuff to give 'em," say the shirkers, so as to place England once more upon her feet commercially. There's nothing like ensuring successful "re-construction" of trade by placing it on such a solid foundation of inefficiency as to render it impossible for home industries to compete in the world's affairs. But what do these wonderful economists think will happen when they have driven all the *real* workers abroad and *they* are left to "carry on" by themselves for themselves?

To be a fashionable Bishop, it will soon be necessary to supplant the motor-car for visiting outlying districts of the diocese by aeroplane. In New Zealand, according to a report to hand, this development has already materialised. It is the Right Rev. Dr. Cleary, Bishop of Auckland, who has thus set the fashion. Bishop Cleary returned on March 14 from a series of visits by seaplane, to various waterside places on the mountainous and very badly roaded Coromandel Peninsula. Piloted by Mr. Vivian Walsh, of the New Zealand Flying School (Kohimarama, Auckland), in a seaplane with a Hall-Scott engine of 125 h.p., the Bishop did this series of visitations at a height of mainly 1,100 ft., and at a speed varying from 65 to 75 miles per hour. He visited Kuaotunu (68 miles by sea from Auckland), Whitianga in Mercury Bay (90 miles from Auckland), Tairua, made a return trip to Kuaotunu for Confirmation, and flew thence to Coromandel



OVER THE ANDES.—On April 4 Lieut. Cortinez crossed the Andes from Santiago (Chile) to Mendoza (Argentina) and back, attaining a height of nearly 20,000 ft. The machine he used was one of the "Bristol" monoplanes presented by this country to the Chilian Government



THE KING AND QUEEN OF BELGIUM'S VISIT TO COLOGNE BY AEROPLANE.—The Queen chatting with her pilot at the Bickendorf Aerodrome, Cologne, on April 28, before leaving. Facing the camera is General Sir W. Robertson, G.C.B., etc.

and Auckland. The trip occupied four days, including delays due to weather; but it saved very many more days of slow and toilful travel over bad roads and steep and rugged bridle-tracks.

NECESSITY being the mother of invention, is being almost daily demonstrated in the case of aerial progress. One of the latest devices to render the navigation of the air more safe is the work of the United States Signal Corps, who have been demonstrating with an aerial beacon or whistling buoy. The beacon is a phonograph, run automatically by electric motor, the record of which repeats continually a single phrase, which gives the name or location of the field near which the beacon is posted. The entire apparatus is attached to antennæ such as are regularly used in wireless telephony. At a height of 5,000 ft. the device, it is stated, was easily heard.

SHOULD this ingenious combination not prove entirely effective, why not "harness" a few hundred of London's whistling-fiend boys, who might well be spared to replace the "phonograph." Our experience is that *their* most insistent and penetrating pitch of note would be difficult to match by any artificial device.

THE Royal Academy is itself again, the air is heavy with *peau d'Espagne* and chit-chat—"My dear, whoever *is* that very complicated looking old lady, isn't she a fright?" There are the usual interiors, the customary knots of leopards, the familiar young ladies with perfect backs, and extremely martial young men. The exciting pictures, such as the dope-

fiend one and the operation for cataract, draw great crowds, and there are several examples of sturdy British art in the Pear's Almanac school; widows with V.C.'s and Union Jack backgrounds, avenging women scantily clad cowering Kaisers, and the like. Seeing some of them one could understand why some of the onlookers chose to wear tinted goggles!

THERE are one or two pictures of munition works, with clangorous steam-hammers and flaming ingots very prominent. Mr. Sargent's "Gassed" makes one incline to the view of the forceful Tommy who said it was "more like an incarnadined frye than a clearing station!" The treatment is unduly decorative. Little *impasto* aeroplanes lurk about the top of the picture. Those aeroplanes have insinuated themselves on to a good many canvases. Capt. Turner's "Channel Patrol" (F2A Flying Boat taking off) is an excellent piece of work, delightfully atmospheric. "The Avengers," by A. J. W. Burgess, depicts as from mid-air the homing destroyers, and a little scout machine above them humming strongly. "Der Tag," the German High Sea Fleet coming in, by W. L. Wyllie, R.A., shows an encircling blimp, but this work is too tidy to convince.

A PICTURE, "Late News," by George Harcourt, shows eager groups with the evening's paper, and recalls memories of days we shall be glad to forget. All the asperities, the raw hideousness of the Mighty Shops is shown in Miss Anna Airy's picture of the "L Press" at Armstrong-Whitworth's forging an 18-in. gun. The British tank attacking a German



THE KING AND QUEEN OF BELGIUM'S VISIT TO COLOGNE BY AEROPLANE.—The Queen is entering the machine at the Cologne Aerodrome, and the King is seen on the left in flying rig

strong point, done by Lieut. Leist, is a peculiar piece of subfusc work, the colour of death. Mr. Caton Woodville has a debonniere picture, the "Entry of the 5th Lancers into Mons." Mr. W. B. Wollen's "Cavalry of the Air" is a convincing canvas, though after so much battle, murder, and sudden death, one was grateful for a simple study of a lady taking a *recherche* looking tea (with egg complete) in bed!

THE gem of the exhibition, from an aeronautical point of view, is Capt. Louis Weirter's "British Aeroplane being pursued by German machines after photographing their positions, August, 1917." This is wondrous bad, so unreal, and so nightmarish, that even the women-folk exclaim at its untruth. It has been given the best position in Burlington House, why?—Heaven knows; but it makes you remember Lord George Sanger's posters, or those multicoloured sheets outside cinema shows. The tail of the British aeroplane has shrunk coyly up into the *fuselage*, and the air is thick with cotton-woolly explosions. "Help from the U.S. Destroyers," by Bernard Gribble, is very different. An almost foundered seaplane, the exhausted pilot flattened helplessly on the wing, and the boat's taffrail lined with eager U.S. Jackies.

"A Lame Duck in the Channel," by Julius Olsson, is a fine picture of a dazzled destroyer limping home under the baleful eye of the moon, peeping through the cloud-wrack overhead. "The Surrender," by Charles Dixon (more German Fleet) has a pretty salmon-flecked sky (was it a fine day when the whipped Hun came in? I think not), and an unnatural clarity.

THERE is magic in Lieut. Gilbert Holiday's work, "Quo fas et Gloria ducunt," the gunners of the 2nd Army passing the saluting base on the Hohenzollern Bridge, December 13, 1918. The cobbles gleam in the rain as the gun-teams go glorying past; you feel proud as you watch it. There is a shilling's worth of inspiration here, though in some of the other rooms it is far to seek. As is always the case, many of the exhibits make you wonder whether the Selection Committee suffered *en masse* from ophthalmia. But there are some jolly little things hidden in odd corners, which the people with lorgnettes don't seem to discover!

AN old friend, Major Arthur Partridge, once a fellow-scribe in New York, and now official starter at St. John's, writes us a few hurried and lurid lines concerning the delay in taking off. It appears that the weather is "perfectly pestiferous," with never-changing east winds, fog, rain, and cold. Neither Hawker nor Morgan has a proper ground from which to unstick, as the island was manifestly not designed for this purpose. Both aerodromes are cramped, awkwardly placed, and prone to turn into seas of mud on the slightest provocation. Trees and rocks abound, and there does not seem to be anywhere to alight in case of engine



OUR YOUNG MAJORS AND VETERAN E.O.'s
"Now look here, my son!" etc., etc.

failure. The men are bearing up stoically in the face of repeated rebuffs, and the sarcastic comments of the locals, though naturally the strain is telling on them. Wherever you go you tumble over inquisitive New York reporters, as persistent as Jerome's snowstorm that "wanted to go to bed with you!"

BUSINESS folk will learn with sorrow that the aeroplane has added what the French call "a new shudder" to life. "The Knight of the Grip"—or the commercial traveller, as we call him, the sportsman with the Little-Oil-Bath tongue, who trots round with non-spillable inkwells, non-leakable fountain pens, and non-readable books, is likely to "drop in" by 'plane. The precedent has already been established; a Norwich building firm sent off an estimate and had it in the enquirer's hands in forty minutes, nearly two hours' saving on the time that a train journey would have occupied.

A NUMBER of smug sportsmen rather given to "thinking through their lungs" are gibing more or less covertly at the waiting aviators in Newfoundland. During the early days of flying in America there was much of this sort of thing, and many a first-class pilot was killed by allowing an angry crowd that wanted something for its money, a crash if nothing else offered—to "haze" him into going up against his own better judgment. We remember an instance where an exhibition pilot was browbeaten by the onlookers on an exceptionally treacherous and gusty day. He flushed to the eyes, and favoured them with some really inspired profanity. Then he went up, in spite of the efforts made to deter him by those who were aware of the risk. A cross wind spoilt his landing, and consequently he sustained a compound fracture of the left leg. Let us hope the men across the water will take for their motto the old—"They say—what say they—*let them say!*"

THERE seem to be possibilities in that aeroplane display department on the ground floor of York House, Kingsway. There are yards and yards of aeroplane linen, suitable for pyjamas, as one salesman suggested (though for our own part we should think that they would produce an effect akin to sleeping on a very scrubby ice-floe). Several rather obese ladies were noticed on the occasion of our visit making *sotto voce* enquiries as to a cheap reduction gear.

A CAPTAIN in the Royal Engineers writes to the papers to say that he is having quite a good time in what was "German East" big-game hunting by aeroplane. Imagine the hectic joys of the pursuit of the coy quagga or the gay gazelle *en avion*! The nimble wart-hog in his fastness could be bombed out, and the demure rhinoceros enticed up a suspended rope. Apart from this sort of thing—it really *would* be rather interesting to see whether the protective colouring of the beasties is as effective from above. In the ordinary way the zebra and the giraffe, for all their dazzle effects, melt into sun-flecked woodland backgrounds perfectly. You can see nothing until a betraying tail or ear flicks and discovers the whole. But I hope the idea won't come to anything; man is quite deadly enough to the jungle folk as it is, without further aids.

The Risks of Flying

SPEAKING at a luncheon given by the Overseas Club and Patriotic League on May 7, Major-General J. E. B. Seely, Under-Secretary for Air, said he looked forward to the time when they would be able to travel from Australia to England in a few days instead of many weeks. There must be many disappointments, and he was told that they would not be able to get the Prime Ministers of the Dominions to visit them because they would drop into the sea, but he did not believe it. From the latest figures it appeared that, if one wanted to learn to fly, one's chance to live was that one would not be killed till he had flown 70,000 miles. Even in the process of learning it would be possible to fly to Australia and back three or four times. In ferrying across the Channel it worked out at only one death in 180,000 miles. Travelling by airship, figures showed that there was likely to be one fatal casualty in every 45,200 miles covered. If during the next few years we made anything like the same advance as had been made in the past five years, we should get rid of all the most common forms of accidents.

Maj.-Gen. Sir Hugh Trenchard, replying to the toast of his health, said the R.A.F. got its name entirely by the work of its pilots and observers and ground men who kept the machines in order. If they went out, say, with 12 machines and lost 11, before he could give an order another squadron went away and turned what looked like defeat into victory. That was what the Germans could never understand.

CIVILIAN AVIATION

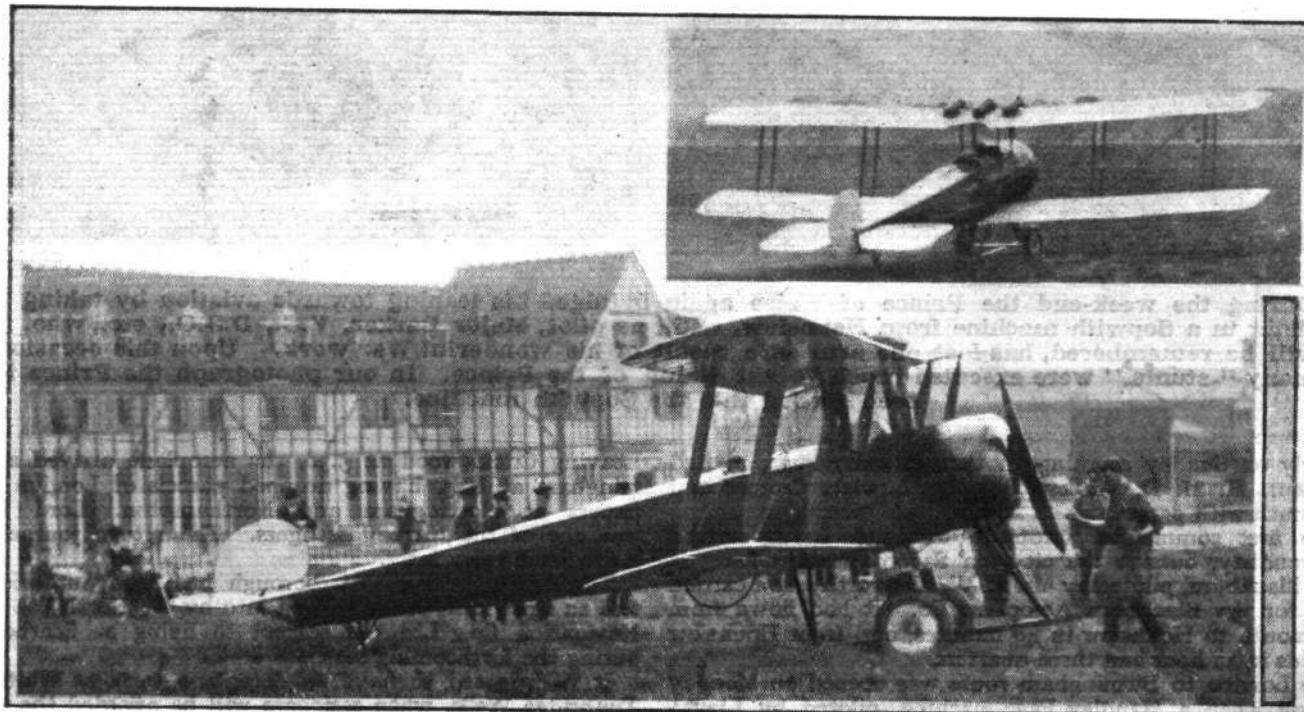
OPENING OF THE SEASON AT HENDON

GLORIOUS weather attended the opening of the civilian flying season at the London Aerodrome, Hendon, on Saturday last. A very fair number of visitors managed to get down to the aerodrome in spite of transport difficulties. Both at Golder's Green and Cricklewood there were long queues waiting for trams and 'buses, and the patience with which these prospective visitors to the aerodrome awaited their turn is a fair measure of their interest in flying. All the same, it will not do to try such patience too severely, and better facilities must be provided before the old aerodrome regains the popularity it enjoyed before the War. Not, of course, that the management of the aerodrome can be held in any way responsible for the London traffic scandal, but in their own interest, and in the interest of flying generally, it is essential that the large number of people who now are taking a keen interest in aviation should not have their enthusiasm damped by such irritating obstacles. It is not, we admit, a matter that can be remedied at a moment's notice, but something might be done to relieve the situation. For instance, as there

to discover our old friend Maj. R. H. Carr, who will be remembered as one of the G.W. pilots before the War, and who has now rejoined his old firm. We imagine that he found the joy-riding somewhat "tame" after his experiences in aerial fighting, but his usual good humour did not desert him, and he entered into the fun of the thing with great energy.

Pre-War visitors to the aerodrome will meet several old friends at Hendon now. Mr. M. D. Manton has joined the Airco firm as test pilot, and is assisting Mr. Birchenough, another Hendon old-timer, in that capacity. Lastly, it is quite like old times when, on passing through the gates, one is met with the rotund, smiling face of Mr. Plant, who is still, as of old, "the St. Peter of the Aerodrome."

There was not a large attendance on Sunday, but the presence of a line of cars showed that the Hendon habit is reviving. Apart from the passenger-flights on Avros, an excellent flight was made on the new Grahame-White "Bantam," probably the smallest machine yet made, and much interest was aroused by the arrival of three Blackburn



OPENING OF THE SEASON AT HENDON.—A youthful visitor is taken for a flip. In the background is seen the new club-house. Inset is one of the Avros starting off.

is now a railway track laid on to the aerodrome from the main line, it should be possible to make arrangements for running trains out from St. Pancras on Saturdays. We are aware that the scarcity of rolling-stock is probably as great on the railway as elsewhere, and that, therefore, the number of trains available for this purpose might not be very great, but even a few would materially help to relieve the congestion at Golder's Green and Cricklewood.

As regards the flying, the Grahame-White Co. had in commission four Avro two-seaters, 110 h.p. Le Rhone engines, which were kept as busy as could be, taking up passengers at 10s. 6d. and one guinea a time. The half-guinea flights were necessarily somewhat short, but even so they compared favourably with the flips made before the War, when a fee of two guineas was charged, and when machines seldom reached a height of more than a couple of hundred feet during a flip. With the Avros now in use, even on a half-guinea flight, the passenger enjoys a turning climb to quite a fair altitude, while in the guinea flights both altitude and duration are considerably greater. If desired, the passenger is treated to "stunts" such as loops, spins, rolls, etc. We noticed that on Saturday a good proportion of the passengers taken up were anxious to crowd into each flight as many thrills as possible, and all of them thoroughly enjoyed their experience. The machines were kept busy all the afternoon, and changed passengers with great dispatch, the pilots keeping their engines ticking over the while. Only when the fuel tanks required replenishing were the engines stopped.

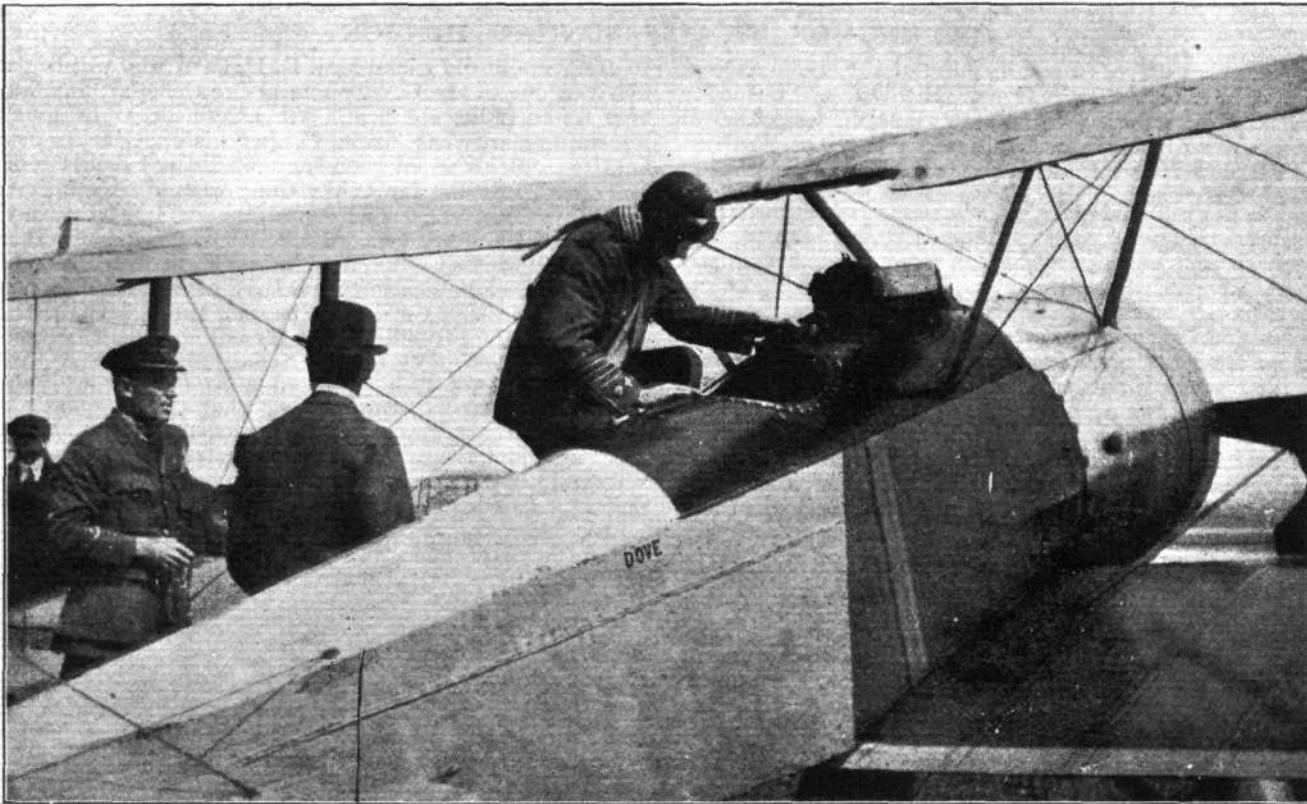
Among the pilots who were giving joy-rides we were pleased

"Kangaroos," which rumour has it have been purchased by the Grahame-White Co. for inclusion in their week-end programmes.

During the week-end, too, the aerodrome at Hounslow has presented a very animated scene, and the Avro machines which are available have been kept very busy taking passengers for "flips." Last week over 400 trips were made, the passengers ranging in age from an old lady of 84 to a child of 4. In response to the demand for flights of longer duration, Messrs. A. V. Roe and Co. are now arranging for a regular series of cross-country trips from Hounslow.

Two long-distance flights were made on May 9 by Handley Page-Rolls-Royce aeroplanes. The first machine, piloted by Maj. Foot, left the Cricklewood aerodrome at 6 o'clock, and visited Bournemouth, the Isle of Wight, Portsmouth, and Southampton, landing at Eastleigh at 8.30, after a non-stop flight of about 145 miles. The second machine, with Lieut. H. M. D. Walker as pilot, which left Cricklewood at the same time, went to Cardiff and Swansea, and returned to Bristol, landing at 9 o'clock, the distance travelled being about 230 miles. At each place mentioned parcels of newspapers were dropped by the aid of "Guardian Angel" parachutes.

On Saturday a Handley Page-Rolls-Royce, piloted by Lieut.-Col. W. S. Douglas, took a load of papers which were distributed by "Guardian Angel" parachutes at Southend, Margate, Broadstairs, Ramsgate, Deal and Folkestone, the machine returning to Cricklewood after a non-stop trip of three hours during which about 280 miles were covered.



During the week-end the Prince of Wales again indulged his leaning towards aviation by taking a flight in a Sopwith machine from Hounslow, with, as pilot, Major Barker, V.C., D.S.O., etc., who, it will be remembered, has lost one arm as a result of his wonderful War work. Upon this occasion many "stunts" were executed much to the liking of the Prince. In our photograph the Prince is seen getting into the Sopwith machine.

Early on Sunday morning another Handley Page, piloted by Lieut. H. M. D. Walker, flew to Norwich, Cromer and Yarmouth with papers.

The first commercial aeroplane to reach Leeds arrived at Roundhay, outside the city, on Saturday afternoon. It was a Blackburn, piloted by Mr. R. W. Kenworthy, and carried goods for the Blackburn Aeroplane Co. It had flown from Portsmouth to Hounslow in 40 minutes, and from Hounslow to Leeds in an hour and three-quarters.

The London to Birmingham route was opened on Monday morning when a Handley Page machine, piloted by Lieut.-Col. W. S. Douglas landed at the Castle Bromwich aerodrome.

Leaving Cricklewood at 5.30, the aeroplane arrived at Birmingham at 8.45, having dropped parcels of London newspapers at Nottingham and Northampton. Lord Belper was one of the three passengers. The return journey was made three hours later.

The Town Clerk of Scarborough has been authorised to seal an agreement to be entered into by the North Sea Aerial Navigation Co., Ltd., in respect to flying at Scarborough during the forthcoming season.

It is proposed to have an aeroplane week at Whitsun at Tunbridge Wells, when residents will be afforded the opportunity of making flights.



England to Spain and Back

In spite of unfavourable weather the flight to Madrid, arranged some time ago, was successfully carried out last week. A four-engined Handley Page-Rolls-Royce, piloted by Maj. C. H. Darley, D.S.C., D.F.C., accompanied by Lieut. Kilbune and Lieut. Murray and three other passengers, left the Manston aerodrome, Ramsgate, at 7.10 a.m. on May 6, but owing to the low altitude of the clouds it was necessary to land on the coast between the mouth of the Adour and the Biarritz lighthouse. Subsequently the journey to the Spanish capital was completed safely.

Two DeH 4's, piloted by Lieut.-Col. W. D. Beatty and Capt. Square respectively, and a Bristol Fighter in charge of Maj. Payne left Biggin Hill on the morning of May 7 for Madrid, but, owing to severe weather in the Pyrenees, a stop had to be made at Pau. The machines, however, reached Madrid on May 9. All four machines made a flight in formation on Sunday over Madrid carrying representatives of the Spanish Government.

On Monday Col. Beatty, accompanied by Lieut. G. M. Jeffery, left Madrid at 6.15 a.m., and landed at Kenley, near Croydon, at 6 p.m., having stopped at Pau and Tours for food and petrol.

Some of the other pilots are staying in Spain to give further demonstrations.

"Canpac" and an Air Charter

THE Canadian Pacific Railway Co. has lost no time in applying for an air charter, and the following reasons which

have been given for the taking of this step are not without interest:—

"Although at present aerial transport is a distinctly expensive matter, the progress that is being made, both in aeroplanes and dirigibles, is so rapid that a company such as the Canadian Pacific should be ready to enter the field as soon as air transport comes within the range of practical politics. Although there are areas in Canada which will for a long time present difficulties, particularly to air pilots, there are other areas which conform to the requirements of experts. Take, for instance, the Western prairies, which offer the conditions described by Gen. Seely as vital, namely, regions where there is plenty of wide space combined with almost complete absence of the airman's real enemies, mist and fog. In such districts air travelling might be made profitable."

War Aviation and the Future

In connection with the summer meeting of the North-East Coast Institution of Engineers and Shipbuilders at Newcastle-on-Tyne, Lord Weir, on July 9, will read a paper on "Aviation during the War and its Possible Future." Lord Weir is also to be presented with the Honorary Fellowship of the Institution.

R.N. Armoured Cars Old Boys' Association

ALL officers and men who have at any time served with the R.N. armoured cars, and who have not joined the R.N. Armoured Cars Old Boys' Association, are requested to send their names and addresses to Lieut.-Comdr. H. E. Perrin, Royal Aero Club, 3, Clifford Street, London, W. 1.



Casualties

Capt. ALLEN PERCY ADAMS, D.F.C., R.A.F., who died on March 6 in Mesopotamia, was the only son of Col. and Mrs. P. Adams, of Oaklands, Halstead, Essex.

BERTIE C. R. GRIMWOOD, R.F.A., attd. R.F.C., who was reported missing on November 7, 1917, now presumed killed on that date, was the only son of Herbert Ruffell Grimwood, Esq., of Villa Thouin, Florence, and grandson of the late Jeffery Grimwood Grimwood, Esq., of 29, Ennismore Gardens, S.W., and Woodham Mortimer, Essex.

Lieut. GERALD HARWOOD, R.A.F., the only son of Horace G. and Hilda Harwood, of "The Rookery," Chislehurst, died on May 1 at the age of 24, as the result of a flying accident.

Capt. E. MIDDLETON KNOTT, A.F.C., R.A.F., who died on May 3, at the age of 26, was the only son of Dr. and Mrs. Knott, of Sutton Coldfield.

Major MAURICE NASMITH PERRIN, R.A.F., Med., was killed on April 28 (his 32nd birthday), as the result of a flying accident.

A. H. B. STACE, R.A.F., who was killed while flying in France on May 3, at the age of 20, was the only son of Mr. and Mrs. H. P. Stace, of Brackley, Northants.

Married

Capt. LESLIE TOWNE BEDDOW, R.A.F., elder son of J. Beddow, Esq., M.R.C.S., L.R.C.P., and Mrs. Beddow, of Thorverton, near Exeter, was married on May 1 at Hampstead Parish Church, to DORIS HOLMES SCOTT, D.A., W.R.A.F., widow of Capt. A. Holmes Scott, M.C., R.E., and only daughter of the late J. S. Clayton, M.D., F.R.C.S. Edin., and Mrs. Clayton, 97, Vicarage Road, Eastbourne.

ARTHUR CYRIL E. COLLINS, son of Mr. and Mrs. Arthur Collins, of Crofton Road, Ealing, was married on April 30 at St. Peter's, Ealing, to DOROTHY JANE, elder daughter of Mr. and Mrs. Frederick BATEMAN, of Westergate, Ealing.

Capt. NOEL GRABOWSKY-ATHERSTONE, A.F.C., R.A.F., eldest son of C. Grabowsky, of Shandon, N.B., was married on April 28 at St. Mary Abbot's, Kensington, to EVELYN SUSANNA AATHERSTONE, elder daughter of Lieut.-Col. H. M. A. HALES, Gloucestershire Regt.

Lieut. RONALD MORTIMER GUINEY, R.A.F., was married on April 29 at St. Peter's, Cranley Gardens, to HELEN DOROTHEA IRENE, elder daughter of the late Lieut.-Col. H. E. PASSY and Mrs. Passy.

Capt. EDWARD E. PACKE, R.A.F., son of the late Rev. W. J. Packe, of Wickham Bishop, was married on April 24 at Holy Trinity, Hertford Heath, to CLAUDIA LILIAN, daughter of the Rev. and Mrs. Charles W. BARCLAY, of the Vicarage, Hertford Heath, Herts.

Capt. ARTHUR W. SARSONS, R.A.F., was married on May 6 at St. Saviour's Church, Eastbourne, to SYBIL MAUDE, daughter of J. BENT, Esq., Eastbourne.

Capt. MAURICE HUGH STEPHENS, R.A.F. (late R.N.A.S.), was married on April 26 at St. Matthias', Richmond, to MARJORIE ISABEL, younger daughter of the late Alexander FINN and Mrs. Finn, of 2, Park Road, Richmond, Surrey.

HAROLD W. L. TOTTENHAM, late Rifle Brigade and R.A.F., only surviving son of Charles Tottenham, D.L., and the Honourable Mrs. Tottenham, Tudenham, Mallingar, was married on April 30 at Holy Cross Church, Cowbridge, to VERONICA, only daughter of Doctor and Mrs. Bowen PERKINS, of Tilbury and Dinas Cross, Pembrokeshire.

To be Married

The marriage of Maj. MARTIN GEORGE BYARD COPEMAN, Leicestershire Regt. and R.A.F., son of the late Mr. and Mrs. Thomas Copeman, of Aylsham, Norfolk, to IANTHE, daughter of the late Capt. JOHN WILLIAM CLAYTON, 13th Hussars, and Mrs. Clayton, of 8, Onslow Gardens, S.W., and Felpham House, Felpham, Sussex, will take place at St. James's, Piccadilly, on May 26, at 2.30.



Naval Anti-Aircraft Masons

At the annual installation meeting of the Royal Naval Anti-Aircraft Lodge of Freemasons, No. 3,790, at Freemasons' Hall, W.C., on May 6, Mr. P. Conrade Webb, a member of

The engagement is announced between Lieut. WILLIAM FROST DAVENPORT, R.A.F., son of Mr. and Mrs. W. Davenport, Telford Avenue, Streatham Hill, S.W., and MARIE Louise, only child of the late HENRI LOUIS BOLOMEY, of Penkridge, and Mrs. H. Davenport, Fairmount, Cannock, Staffs.

The engagement is announced between Capt. FRANCIS C. BROWN DOUGLAS, late R.A.F., eldest son of Mr. and Mrs. C. C. Brown Douglas, 187, St. James's Court, London, S.W. 1, and DORAH BEVAN, elder daughter of Mr. and Mrs. NIXON, of Hope Range, Davenport, Cheshire.

The engagement is announced between Capt. GEORGE FREDERICK DRUDGE, R.A.F., of "The Avenue," Freshwater, Isle of Wight, and NELLIE, eldest daughter of Mr. and Mrs. W. TRENODATH, of "Ouse House," King's Lynn, Norfolk.

A marriage has been arranged, and will shortly take place, between Capt. DOUGLAS GRINNELL-MILNE, late Royal Fusiliers and R.A.F., elder son of George Grinnell-Milne, 23, Ennismore Gardens, S.W., and Mme. la Baronne OLGA BEELEARTS VAN BLOKLAND, of The Hague.

The engagement is announced between Lieut.-Col. Sir NORMAN LESLIE, Bt., C.B.E., Central India Horse and R.A.F., Air Attaché to the British Embassy, Paris, only son of the late Sir Charles Henry Leslie, Bt., Indian Army, and BETTY ELISE, second daughter of Mr. J. T. B. SEWELL, C.B.E., LL.D., and Mrs. Sewell, of 47, Boulevard Lannes, Paris.

The engagement is announced between Capt. T. CARLYON LUKE, M.C., R.E., attached R.A.F., elder son of the late Mr. E. Ernest Luke and Mrs. Luke, late of Clevelands, Bere Alston, S. Devon, and ENID ISABEL, younger daughter of J. B. YOUNG, B.A., late Indian Educational Service, and Mrs. Young, of 7, Trinity Place, Eastbourne.

The engagement is announced between Lieut. RUTHVEN M. C. MACFARLANE, M.C., R.F.A., attd. R.A.F., son of Mr. and Mrs. Ruthven Macfarlane, of Anerley, Eastbourne, and MURIEL, younger daughter of the Rev. and Mrs. F. ATKINSON, of Blackwater House, The College, Eastbourne.

The engagement is announced between Maj. W. J. TEMPEST, D.S.O., M.C., R.A.F., son of Mr. W. F. Tempest, J.P., of Ackworth Grange, near Pontefract, Yorks., and CAMILLE MILLICENT, elder daughter of Mme. C. M. BEST and the late Mr. J. P. Best, of Brussels and Antwerp.

Items

Lieut. THOMAS MARTIN PHILLIPS, Pilot, R.A.F., who was reported missing on September 18, 1918, was last seen over the German lines on a bombing raid, flying a D.H. 9 with Lieut. R. E. Owen, Observer. A shell burst near them, when the machine began to spin. Can any officer who was with them on that day, or in the 103rd Squadron, also returned prisoners, give any information of the incident? Communication from anyone will be greatly appreciated by his parents, Mr. and Mrs. H. Phillips, 8, Penhill Terrace, Brynhyfryd, Swansea. We regret that the name of Lieut. Phillips was incorrectly given as Thomas N. Phillips in our issue of May 1.

Lieut. L. C. SCROGGIE, R.A.F., 213th Squadron, missing September 25, 1918, on Camel D. 8216, supposed brought down near Bruges, was reported prisoner of war October 4. Any information regarding him will be gratefully received by his mother, Mrs. Scroggie, 118, Broomhill Road, Aberdeen.

Mr. STUART GRAHAM, who was an air pilot in the British Navy, has arrived at Ottawa to take charge of two planes released by the Canadian Department of Naval Affairs for forest protection in Quebec.

The will of Lieut. ROBERT EDWARD ANGUS, Ayrshire Yeomanry, attd. R.F.C., killed in France has been proved at £14,752.

The will of Capt. AUBREY CHARLES FINCH HILL, R.A.F., of Dover, aged 43, has been proved at £21,370.

London rank, was installed as W.M. for the ensuing year in succession to Mr. G. Woods Wollaston, M.V.O. (Richmond Herald), Past Deputy G.D.C. Although the Lodge was consecrated only two years ago, its numbers have rapidly increased.

AVIATION IN PARLIAMENT

Missing Men

Mr. MANVILLE, in the House of Commons on May 6, asked the Secretary of State for War whether he is aware that dissatisfaction exists as to the steps which are being taken by the Air Ministry to ascertain the fate of missing airmen; and whether any steps are being taken to press the German authorities to inquire more thoroughly from their Army medical service for further lists of British wounded?

The Under-Secretary of State for Air (Maj.-Genl. Seely): I sympathise fully with the anxiety that is felt in reference to this matter and can assure the hon. member that every step which is considered likely to produce any useful result is being taken by the Air Ministry.

Commercial Aeroplanes and the Humber

Lieut.-Comdr. KENWORTHY asked the Under-Secretary of State to the Air Ministry why the landing-place for commercial aeroplanes in the Humber district has been chosen at New Holland, on the opposite side of the river to Hull, and whether he will consider the early establishment of a commercial aerodrome on the north side of the Humber near to Hull?

The Under-Secretary of State for Air (Maj.-Genl. Seely): New Holland was selected as the aerodrome best suited in the neighbourhood of Hull for the combined needs of civil and military aviation. As civil aviation develops it is probable that its interests may require another site, and, if so, the Air Ministry will be very ready to reconsider the matter.

Lieut.-Comdr. Kenworthy: Is the right hon. gentleman aware that that is half an hour from Hull across the river?

Maj.-Genl. Seely: Oh, yes; I am well aware of that; but it was the first available site, so we selected it. If at a later date it is desired to change, an officer of the Air Force will be sent to investigate.

Lieut.-Comdr. Kenworthy: Will this station be the aerodrome from which to fly across the North Sea?

Maj.-Genl. Seely: I cannot say that without notice.

British Aeroplanes for South America

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether he is aware that the French Government are supplying surplus aircraft to the South American Republics; and whether action is being taken to ensure that British commercial interests receive adequate furtherance in these areas?

Maj.-Genl. Seely: I am informed that the French have sent a certain number of aeroplanes to one of the South American Republics. With regard to the second parts of the question, facilities have been granted to various firms who were desirous of sending their representatives to South America, and these representatives are now in various parts of that continent. In addition, fully equipped missions are about to be sent to various countries.

R.A.F. Colonial Cadets

Mr. JOYNSON-HICKS asked the Under-Secretary of State to the Air Ministry (1) how many Colonial cadets were in training at the date of the Armistice; and how many have received the gratuity and the uniform allowance of £50; and (2) what is the position of Colonial cadets who have put in for a deferred passage; and whether they are able to draw their allowances for kit, &c., in the meantime?

Maj.-Genl. Seely: The number of Colonial cadets in training with the R.A.F. at the date of the Armistice was about 5,187.

Overseas cadets who accepted deferred repatriation and were demobilised before February 15, 1919, will be granted honorary commissions in the R.A.F., and the same outfit allowances as those given to Imperial cadets, which are as follows: £50 less the value of any issues in kind, to those cadets who qualified as observers or passed qualification "B" before January 1, 1919.

Those cadets who did not so qualify will be reimbursed for expenditure incurred on account of outfit up to a limit of £35, less the value of any issues in kind. Overseas cadets who accepted deferred repatriation after February 15, 1919, will be given temporary commissions in the R.A.F. from that date until the date of their demobilisation and an outfit allowance of £50, less the value of any issues in kind. A large number of cadets, in anticipation of being commissioned, purchased outfit and signed orders on Messrs. Cox and Co. authorising them to pay the bills incurred from the outfit allowance which would become due to them on being commissioned. The amount of these orders will be deducted from the amount of the outfit allowance in each case.

As regards the issue of the additional pay, outfit allowance, etc., to these cadets, as well as to the other Overseas cadets who did not accept deferred repatriation, it has not been possible in the time available to obtain all the required information and to effect the necessary adjustments in the cadets' accounts to arrive at the balance that may be due to them, but this will shortly be accomplished. Many of the cadets concerned are paid by the Dominion Forces or have been returned to the Dominion Forces for repatriation, from whom nominal rolls are being obtained giving the necessary information for calculating the amount of additional pay and outfit allowance to which these cadets now become entitled. In the meantime substantial advances on account of pay and outfit allowance have been made to cadets prior to embarkation, and the balance of their accounts will be remitted to them as soon as possible.

Mr. BILLING: Will the right hon. and gallant gentleman give his personal attention to the question of the payment of these cadets, and the various other ratings? Is he aware that on about five different occasions during the War the uniform was changed, and this heavily penalised the poorer cadets?

Maj.-Genl. Seely: I have given personal attention to the matter, and will continue to do so. It is a difficult question. But I think the answer I will circulate will show that a good deal has been done.

Major Batchelor's Death

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether he will state the official number of the Handley-Page aeroplane on which Maj. Batchelor, R.A.F., was killed at Andover; and whether it was one of the machines which had been left in the open at Hendon aerodrome for so long?

Maj.-Genl. Seely: The official number of this machine was F 3748. It had not at any period during its stay at Hendon been stored in the open.

R.A.F. Pay

Lieut.-Col. MALONE, on May 7, asked the Under-Secretary of State to the Air Ministry whether any new rates of pay for the R.A.F. are contemplated; whether the question has yet received Treasury or Government approval; and whether it can be anticipated when the new rates of pay will be published?

The Under-Secretary of State for Air (Genl. Seely): Revised rates of pay for officers and men of the R.A.F. are being considered. Until the detailed rates have been considered by the Government in conjunction with those for the other Services, no definite date for their publication can be stated, but I am aware of the importance of an early settlement.

Controller of Civil Aviation

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether his proposals for the staff of the Controller of Civil Aviation have in

any way been subject to revision from the Treasury; whether he will publish what his original proposals were; and what section of the staff has been omitted on account of Treasury pressure?

Genl. Seely: It would be contrary to precedent and to the public interest to make communications necessarily passing between the Treasury and other Government Departments with regard to expenditure the subject of discussion in the House.

Timber for Aeroplanes

Mr. REMER asked the Under-Secretary of State to the Air Ministry whether the present advisers as to the timber required on aeroplanes are the same officials who sanctioned the use of cypress during the War; why the many warnings of practical timber merchants as to the use of this wood were disregarded; and what was the cost of scrapping machines made of this wood after the use of cypress had been prohibited?

Genl. Seely: The answer to the first part of the question is in the negative. Considerable changes in the personnel of the Technical Department have taken place owing to the return of officials to their civil occupations. As regards the second part of the question I would refer the hon. member to the answer given to him on this subject on the 1st inst. I am endeavouring to obtain details as to the cost of substitution of other woods for cypress in the machines concerned and will communicate with the hon. member as soon as possible.

Royal Air Force (Bonus)

Lieut.-Col. MALONE asked the Secretary of State for War whether R.A.F. officers and men who have not yet been demobilised and who are not volunteers for the Army of Occupation are receiving the increased rate of pay from February 1; whether he is aware that temporary naval officers of the Royal Naval Volunteer Reserve who are in an analogous position are receiving all the benefits referred to, and whether he will take steps to put the pay of such officers of the R.A.F. on an equal footing?

Maj.-Genl. Seely: Full bonus is being given in all cases from May 1. The cases in which it may be given in arrear to officers and men who are in course of demobilisation, but have not been demobilised on May 1, are under consideration. An early decision will be given.

Women's Royal Air Force

Lieut.-Col. MOORE-BRABAZON asked the Under-Secretary of State to the Air Ministry what is the policy to be adopted as to the continuation or otherwise of the Women's Royal Air Force; whether he is aware that many drivers, after two years of successful driving, are being dismissed as incompetent and men with no experience at all taken in lieu, and will he take steps to put a stop to this practice?

Maj.-Genl. Seely: The question of the continuance or otherwise of the Women's Royal Air Force as a part of the permanent Royal Air Force has not been decided. No women drivers have recently been dismissed for incompetence, but a certain number have been replaced by men as men have become available for work for which they are thought to be more suitable than women.

R.A.F. (Parachutes)

Mr. CLOUGH asked the Under-Secretary of State to the Air Ministry whether his Department is, in view of accidents, devoting special attention to the feasibility of providing all aeroplanes with parachutes; and whether he can make any statement on the subject?

Maj.-Genl. Seely: Experiments in the provision of parachutes for aircraft are being pressed on, and considerable results have been attained. The hon. member can be assured that all possibilities in regard to the use of parachutes will be explored by the Air Ministry.

Aircraft Manufacturing Company

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether he will state the number of applications which have been made by the Aircraft Manufacturing Co. and allied companies under the control of Mr. Holt-Thomas for the services of important officers or officials from the Royal Air Force; whether he will state the names of those officers or officials who have been released and the positions which they hold in the company; and whether he is aware of any Government official or officials who hold interests in the Holt-Thomas group?

Maj.-Genl. Seely: No application has been received by the Air Ministry from the Aircraft Manufacturing Co. for the services of officers serving in the Royal Air Force or the Air Ministry. Two senior officers of the Royal Air Force and one official of standing have joined or are joining the company after terminating their connection with the public service, but I am not aware of the positions offered to them. As regards the third part of the question, I have no information.

Surplus Aeroplanes

Lieut.-Col. MOORE-BRABAZON asked the Under-Secretary of State to the Air Ministry whether he will arrange with the Treasury that the Disposal Board carry out the recommendations of the Civil Aerial Transport Committee with regard to the selling of aeroplanes at a reduced price (Appendix IV, paragraph 10, sub-section B) to substantial companies, with a view to helping commercial aeronautics from a national point of view?

Maj.-Genl. Seely: The recommendation referred to is one which with other cognate questions is at present receiving the close attention of the Air Ministry.

Demobilisation (Deferred Payment System)

Mr. HENDERSON asked the Secretary of State for War whether the deferred scheme of payment on demobilisation for men of the Royal Air Force applies to men stationed with the British Expeditionary Force; and, if so whether he is aware that some Royal Air Force demobilisation officers with the British Expeditionary Force are not aware that this scheme exists?

Maj.-Genl. Seely: The deferred payment system has now been cancelled as it has served its purpose. It was not applied to men demobilised from abroad all such men were (and are being) dealt with under the ordinary procedure.

Atlantic Flight

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether the prospective Atlantic flyers were recently interrogated by the Air Ministry as to their reasons for delay in crossing the Atlantic; and whether he will state the general policy of the Government towards this flight?

Maj.-Genl. Seely: The answer to the first part of the question is in the negative. Far from urging on the attempt the attitude of the Air Ministry has been, and is, to enjoin caution upon those engaged in this enterprise. The officers who are attempting the flight are not under the control of the Air Ministry, but nevertheless every possible information has been furnished to them and every assistance given with regard to navigation and wireless instruments which can make the venture safer. I may be allowed to add that the record of fearless endurance of everyone of the British competitors is such that they can well afford to decide on the practicability of the flight without fear of caving.

London Gazette, May 2.

Technical Branch

Sec. Lieut. (actg. Lieut.) W. W. Hammond to be actg. Capt. whilst employed as Capt., Grade (A) ; Nov. 1, 1918 (substituted for notification in the *Gazette* of Feb. 25 and March 14).

Lieut. H. V. Harle to be Lieut., Grade (A), from (Ad.) ; Dec. 15, 1918.

Lieut. T. W. Cave, M.C., to be Lieut., Grade (B), from (O) ; April 17.

Sec. Lieuts. to be Lieuts., without pay and allowances of that rank :—(Hon. Lieut.) T. McC. Yarwood ; April 2, 1918. T. H. Sills ; April 19.

Sec. Lieuts. to be Sec. Lieuts., Grade (B), from (Ad.) :—H. T. Miles ; Oct. 1, 1918. Sec. Lieut. S. W. Banfield ; Oct. 30, 1918. F. T. Harris ; March 24.

Maj. T. O. H. Lees (Maj., R.M.L. Inf.) relinquishes his commn. on ceasing to be employed ; April 7.

(Then follow the names of 26 officers who are transfd. to the Unemployed List under various dates.)

The surname of Capt. (Hon. Maj.) W. R. G. Atkins is as now described, and not Atkinson, as stated in *Gazette* of March 21.

The rank of Lieut. (actg. Capt.) A. R. B. Gill is as now described, and not Lieut., as stated in *Gazette* of April 15.

The notification in *Gazette* of March 11 concerning Maj. F. R. E. Davies, O.B.E., is cancelled.

The notification in *Gazette* of March 28 concerning Maj. F. R. E. Davis is cancelled.

The notification in *Gazette* of Dec. 17, 1918, concerning Lieut. H. Stansfield is cancelled.

Motor Boat Branch

Capt. E. D. H. Robinson is transfd. to Unemployed List ; April 18.

Medical Branch

P. C. Livingston is granted a temp. commn. as Capt. ; May 1.

Transferred to Unemployed List :—Capt. A. L. George ; April 8. Capt. A. G. Holman ; April 9. Lieut. H. G. James ; April 11.

Capt. M. E. H. Wale relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; May 3.

Memoranda

J. S. T. Bradley (Maj., M.G.C.) is granted a temp. commn. as Maj., and to be Temp. Lieut.-Col. whilst specially employed ; Aug. 1, 1918 (substituted for notification in *Gazette* of Oct. 4, 1918, page 11717).

The following Overseas Cadets are granted temp. commns. as Sec. Lieuts., 316810 F. W. Anderson, 316811 N. A. Avery, 316797 W. H. Brown, 170573 W. D. Brown, 184186 A. A. Boon, 182808 G. W. Brandon, 179486 W. H. B. Buckhurst, 182766 G. Carter, 184605 F. M. Clarke, 182587 W. G. Coull, 182598 S. A. Claghan, 316798 G. H. Christensen, 316818 F. S. Collier, 183586 M. W. Curtis, 316877 G. P. Deal, 316819 W. M. Elliott, 316444 E. H. Flowers, 182589 F. J. A. Fulton, 182592 S. Gallachan, 179488 A. V. Gladstone, 316802 D. C. Godfrey, 182594 R. M. D. Hall, 182593 C. D. Handley, 180272 H. A. Hamilton, 316814 F. C. Harris, 317820 S. G. Hay, 316822 L. R. Henrys, 316821 B. J. Hair, 316823 L. B. Harris, 316812 J. R. Johnston, 182598 A. H. Keene, 316809 K. Kissling, 26849 J. Larkin, 316840 W. Littlejohn, 316824 W. T. Luxton, 110863 A. E. Matthews, 182599 M. A. Manhire, 184345 L. E. Maher, 175763 W. S. A. Mills, 316826 H. I. N. Melville, 316827 L. Myres, 316801 W. R. Macaulay, 182602 A. McArthur, 684476 J. E. McCarthy, 182603 A. E. W. McDonald, 316835 R. G. MacDonald, 316828 J. E. McDiarmid, 316801 I. A. McGregor, 316804 W. T. McKeague, 184636 J. Oliver, 316717 J. Parr, 184128 R. R. Parsons, 181866 M. J. Plaistowe, 316806 A. D. Poulton, 316805 C. W. Preece, 181059 A. S. Pursell, 179495 J. O. Richards, 182604 J. A. D. Ritchie, 316829 J. R. Richardson, 316830 W. G. Ross, 316807 E. Roe, 181789 E. L. Rose, 184642 T. K. Russell, 316833 K. Simpson, 316831 L. W. Stewart, 184130 L. H. Stewart, 184644 E. N. H. Stewart, 184129 H. A. Stark, 316834 C. H. Taylor, 180310 A. F. Tasker, 31277 P. A. Turner, 316839 J. A. Taylor, 182606 N. L. Vale, 316830 R. J. Walker, 316837 G. G. N. White, 316809 R. J. M. Webber, 316789 O. Warnock, 316800 D. Wingfield, 176841 C. T. Wildsmith, 184131 W. W. Withnell, 156582 S. A. Wilcox, 12939 J. P. Wilson, 316567 R. W. B. Young, 137885 E. W. Abrams, 176452 M. Adams, 182145 T. R. Abbott, 137886 E. Adendorff, 183851 E. L. Ashley, 182126 P. J. Atkinson, 182127 H. W. Atkinson, 183876 T. Andrews, 181902 J. R. Aird, 176451 J. Ashfield, 181874 J. E. Anderson, 181852 R. W. Amm, 6606 I. J. Allan, 184494 R. Anderson, 179599 P. R. Alston-Hole, 184741 C. Andrews, 2656 N. C. Archibald, 184245 G. L. R. Aspeling, 270415 D. M. Adlam, 27041 D. Avlam, 177336 W. B. C. Alderman, 442 H. A. Anderson, 184246 J. Ayliffe, 12509 C. Anderson, 1287 L. H. Austin, 316576 H. V. Balden, 182298 V. C. Berrange, 182128 A. F. Bosman, 181856 G. W. Breakspeare, 182148 T. T. Bielski, 183852 G. C. Botts, 184497 H. J. Boulle, 181855 D. D. Bradford, 184250 R. D. Bryce, 182281 V. Brown-Dennison, 182530 E. Bone, 178144 W. S. Bain, 181864 R. T. Barr, 178205 J. Burrus, 181854 L. M. Bassett, 182146 G. Borthwick, 176566 J. V. Bolton, 184209 F. Becker, 182833 A. V. Bramwell, 182129 C. R. Brooks, 185248 F. Basson, 182131 B. G. R. Baxter, 184496 R. C. Brien, 176453 T. W. Bruton, 182280 A. K. H. Brooke, 184742 D. B. Barbour, 182473 C. F. Baker, 61213 R. T. Beynon, 5329 A. Ballantyne, 435 P. W. Brown, 182147 W. A. R. Botha, 182226 J. D. Blomerus, 181877 D. E. Breerton, 176455 V. Beaumont, 184495 V. F. M. Berry, 183947 J. Bothwell, 182172 H. Blair, 184447 H. R. Burt, 178146 J. D. Boyd, 2636 C. D. E. Braine, 239 J. R. H. Broughton, 184792 F. J. Boogh, 7418 F. V. Beecham, 172 D. H. Baldwin, 316719 F. D. Blackmore, 184249 C. A. Blackburn, 184496 R. C. Bryan, 181152 M. P. Croxford, 182130 T. P. Caister, 181879 G. Clough, 182143 W. J. Callaghan, 182283 W. E. Casey, 184499 F. P. Christie, 137905 H. Coen, 183854 T. M. Churcher, 184565 M. C. Coombs, 181878 R. S. Cowie, 184253 P. E. Chandley, 179716 H. S. Cross, 182132 E. C. Cross, 184252 N. Campkin, 182284 G. Chaplin, 182227 A. N. Copland, 183857 R. Cumming, 176462 M. C. Cooper, 182150 A. Connock, 184233 R. C. Cunliffe, 176461 F. R. A. Chappe, 183853 R. H. Cooper, 182285 J. H. E. Clark, 179718 V. H. Collins, 184498 D. N. Cheshire, 137923 J. Coughlan, 181208 D. T. Cockrane, 335 H. J. Chandler, 184210 R. H. Collett, 1151 H. Canard, 182151 G. A. Cory, 178155 P. M. Curtis, 982 F. C. Creed, 166 H. W. A. Cooper, 128978 D. Campbell, 316580 M. N. Clark, 176509 P. de Beyer, 176471 C. R. Dryer, 181880 J. F. du Toit, 316584 R. A. Douglas, 181858 A. J. E. de Smidt, 182186 J. C. Donohoe, 182088 H. S. Downham, 184500 E. E. Durham, 183608 H. E. de Smidt, 182141 H. W. Donoban, 182240 J. H. Densham, 182154 O. B. Duckles, 182200 H. A. Davies, 182259 P. L. Drost, 182157 W. A. Dawson, 182155 R. E. Dick, 137959 V. R. Day, 182156 J. A. Dalziel, 183605 J. H. Deenik, 183879 W. T. Dowie, 181859 E. J. Davis, 2911 G. Duncie, 18254 J. F. Dykman, 181860 J. H. Darroll, 180024 B. Davis, 316582 F. C. Dalley, 182286 J. B. Davis, 182229 E. Earl, 184501 J. L. Edwards, 182275 D. Erasmus, 176472 A. H. Elton, 184502 D. C. Eaton, 181869 D. Edwards, 182208 E. G. Egling, 176480 R. G. Elliott-Troy, 176514 C. C. Elliott, 182274 P. H. B. Everett, 182142 A. Egan, 183858 C. S. Erswell, 184255 V. R. Estment, 1662 A. Edwards, 316793 C. W. S. Fisher, 182159

A. W. Freemantle, 184256 L. W. Frewen, 182158 F. W. Fraser, 182241 C. Ferraris, 176518 G. P. Faul, 183880 R. W. Fairall, 182187 H. J. Field, 182173 E. F. Frances, 184503 R. K. Fletcher, 176521 C. R. Fletcher, 176920 D. V. Fiddien-Green, 184257 W. Fowler, 182138 S. A. Fish, 137961 A. J. Fraser, 184506 C. E. Fincham, 176565 L. C. Flanders, 184506 R. Fisher, 1308 W. N. Frames, 104521 A. E. Field, 184511 V. R. Gordon, 179474 W. A. Gead, 181881 E. A. Geraghty, 181871 A. R. Gray, 182288 F. D. Grant, 184507, R. B. Garland, 184508 L. P. Grey, 182161 J. D. A. Green, 182230 J. L. Gillespie, 182513 C. V. Groom, 184258 R. F. Gainsford, 182166 E. C. C. Gedye, 182174 V. C. Gibson, 182189 J. R. Gibson, 176523 C. D. Gowling, 182209 S. F. Grinstead, 182243 J. B. Grant, 184512 D. Gotlieb, 184509 R. Gilbert, 181862 R. A. Graham, 176531 J. M. Green, 182242 C. J. R. Gunning, 184259 E. B. Gill, 182188 A. Gammie, 184510 A. C. Gowlett, 4738 R. C. Greemer, 73835 A. L. Gordon, 184419 G. Geddes, 316595 W. F. N. Harward, 180828 A. G. Huntley, 184490 E. A. Harlow, 184263 F. J. Hellier, 182211 L. W. Hurd, 182162 C. E. Hill, 181841 V. R. J. Henman, 182245 J. C. Hurry, 184514 M. C. Hanna, 176504 A. O. Hassall, 182190 C. Hill, 184518 S. W. Hartwell, 184519 R. A. Hesom, 184260 H. Haikney, 183861 W. N. Hallett, 184261 G. C. Hangar, 182246 W. B. Hendry, 181872 S. Heard, 182090 N. R. Hooper, 182125 O. L. Harvey, 183862 A. P. Horak, 184262 C. Hill, 183860 J. G. Hoal, 176543 J. B. D. Herbert, 182210 H. W. Hart, 184520 E. J. Hurry, 12315 H. H. Higgs, 182289 S. D. Holmes, 183882 G. L. Handley, 100601 T. H. Houghton, 176805 E. Hodgson, 184515 E. C. Hale, 184481 V. F. Hall, 184793 P. E. B. Holliswell, 184516 S. R. Harrison, 184517 J. W. Hastic, 178175 W. H. Hudson, 182247 D. Hamilton, 176541 W. J. Hodson, 184368 G. L. Ingman, 182089 J. G. Jacobs, 183883 F. I. Judd, 182210 H. Jones, 184522 S. H. Jones, 184523 G. L. Jobling, 52040 C. J. S. Jolliffe, 180042 W. A. Kirsten, 182213 G. O. Kelly, 182260 V. Kenmuir, 182135 C. A. Kelsey-Harvey, 182232 J. King, 184265 V. O. C. King, 182531 A. E. Kierander, 182231 J. H. Kennedy, 181948 J. Klue, 182249 A. J. Kuling, 182248 H. D. Kenmuir, 1586 B. T. Koch, 183885 C. L. Lamb, 183834 N. Le Roux, 184462 H. A. Law, 184525 W. Laurie, 182109 L. L. Lavin, 182153 L. Larkin, 182233 T. Lockyer, 182112 N. J. Latz, 182234 A. W. Leitch, 182261 H. Lumsden, 184526 C. J. Laver, 182192 J. Lister, 182110 G. Leeson, 184527 J. Lowe, 182111 A. Lloyd, 184528 J. Love, 182263 L. C. Lawson, 920 I. C. G. Lawrie, 181846 A. W. Lewis ; Feb. 15.

Capt. P. Benn, D.S.O., D.S.C., relinquishes his commn. on being elected M.P. ; Dec. 28, 1918.

Temp. Hon. Capt. J. E. Valentine relinquishes his commn. on ceasing to be employed ; Feb. 16.

Capt. J. P. Cherry (Dur. L.I.) relinquishes his commn. on ceasing to be employed ; March 15.

Notification in *Gazette* Sept. 10, 1918, concerning Sec. Lieut. (Hon. Lieut.) A. Ward is cancelled.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

London Gazette, May 6.

The following temporary appointment is made :—

Area Commander.—Col. (actg. Maj.-Genl.) A. V. Vyvyan, C.B., D.S.O., relinquishes the actg. rank of Maj.-Genl. and to be actg. Brig.-Genl. while so employed ; April 26.

Flying Branch

Capt. to be graded for purposes of pay and allowances as Capt. (A'ship.) : H. T. Jones ; July 2, 1918. A. S. Elliott, D.S.C., from Aug. 14, 1918, to March 18. H. C. Irwin, to Jan. 31 ; G. F. Meager, A.F.C. ; Nov. 8, 1918. L. Whitworth, D.S.C., from Nov. 15, 1918, to March 18. H. A. H. Leetham ; Nov. 25, 1918. G. S. Greenland ; Nov. 26, 1918. S. E. Taylor, D.S.C., Dec. 6, 1918.

Sec. Lieuts. to be Lieuts. :—A. A. Malcolm, L. B. Stewart ; April 2, 1918. C. P. Sisley ; May 13, 1918. E. C. Richards ; Dec. 27, 1918. P. W. Watson ; Feb. 1.

Sec. Lieut. J. S. Harrison to be actg. Lieut. while employed as Lieut., from Sept. 26, 1918, to April 30.

Lieut. S. Fremlin (Lieut., L.A.R.O.) relinquishes his commn. on reverting to the I.A.R.O. ; March 21.

The following relinquish their commns. on ceasing to be employed :—

Lieut. R. M. Grant (Lieut., Canadians) ; Jan. 9. Lieut. T. B. M. Brown (Lieut., R.F.A.) ; Jan. 10. Lieut. W. A. Watson (Lieut., Alb. R.) ; Feb. 11. Sec. Lieut. (Hon. Lieut.) R. B. Francis (Lieut., Can. M.G.C.) ; Lieut. J. R. Law (Capt., Can. A.S.C.) ; Feb. 17. Lieut. W. K. Whittle (W. Yorks R.) ; Feb. 19. Lieut. J. A. Dickie (Lieut., Manitoba R.) ; March 5. Lieut. H. W. Underhill (Lieut., R.G.A.) ; March 11. Lieut. (Hon. Capt.) F. G. H. Manville, M.C. (Capt., Sask. R.) ; March 13. Lieut. G. A. Mercer (Lieut., Can. Cyclist C.) ; March 21. Sec. Lieut. (Hon. Lieut.) H. F. Hicks (Lieut., Nova Scotia R.) ; March 27. Lieut. D. J. Stewart (Lieut., York and Lanes. R.) ; April 9. Lieut. (Hon. Capt.) S. A. Flavelle (Capt., E. Ont. R.) ; April 14.

(Then follow the names of 235 officers who are transfd. to the Unemployed List, under various dates. We regret that owing to great pressure on our space we are unable to reprint this portion of the List.—Ed.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—F. H. Johnson ; March 22. J. D. M. Miller (contracted on active service) ; April 22. (Substituted for notification in *Gazette* of Jan. 7.)

Lieut. A. F. Platt is dismissed the Service, His Majesty having no further occasion for his services as an officer ; April 7.

Sec. Lieut. W. T. Morrison resigns his commn. ; May 7.

The initials of Lieut. E. W. O. Hall are as now described, and not E. O. W. as stated in *Gazette* of March 7.

The initials of Lieut. A. L. Monger are as now described, and not N. L. as stated in *Gazette* of April 13.

The notification in *Gazette* of Dec. 31, 1918, concerning Sec. Lieut. E. Dumville is cancelled.

The notification in *Gazette* of Dec. 13, 1918, concerning Sec. Lieut. E. H. Seare is cancelled.

The notification in *Gazette* of April 18 concerning Lieut. J. Davidson is cancelled.

The notification in *Gazette* of March 21 concerning Sec. Lieut. F. Johnson is cancelled.

The notification in *Gazette* of March 28 concerning Sec. Lieut. H. J. Collar is cancelled.

The notification in *Gazette* of Feb. 14 concerning Lieut. S. R. Mantle is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. S. E. King is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. (Hon. Lieut.) D. Millar is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. (Hon. Lieut.) D. Millar is cancelled.

Administrative Branch

To be Majs. and relinquish the grading for purposes of pay as (S.O.) :—
Capt. (actg. Maj.) N. A. Daniell; Jan. 7. Maj. W. J. King, M.C.; Feb. 3.
Capt. (Hon. Maj.) (actg. Maj.) R. H. Howell to be Maj. from (S.O.); Nov. 18, 1918.

Capt. (actg. Maj.) J. Selwyn to be Capt., and relinquishes the actg. rank of Maj. from (S.O.) from Oct. 26, 1918, to Dec. 20, 1918.

Lieut. G. A. Miller to be actg. Capt. whilst employed as Capt. from Aug. 8, 1918, to April 30.

C. B. Stead (Lieut., R.H.A., T.F.) is granted a temp. commn. as Lieut.; Oct. 1, 1918, and to be actg. Capt. whilst employed as Capt. from Oct. 1, 1918, to April 30. (Substituted for notification in the *Gazette* of Feb. 14.)

Lieuts. (A.) to be Lieuts. :—W. U. Hughes, H. Macpherson; April 17.

Lieut. C. C. Duffield to be Lieut., from (T.); Oct. 2, 1918. (Substituted for the notification in the *Gazette* of April 4.)

Sec. Lieut. F. Sumpter to be Lieut.; April 2, 1918.

Sec. Lieut. T. Mann to be Sec. Lieut., from (A. and S.); April 17.

Sec. Lieut. C. H. Bartlett (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut.; April 1, 1918.

Lieut. F. A. Perren (Sec. Lieut., Hamp. R.) relinquishes his commn. on ceasing to be employed; Nov. 18, 1918.

(Then follow the names of 60 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. H. Marks relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 7.

The following Sec. Lieuts. resign their commns. :—R. M. Ross, H. Worley; May 7.

Sec. Lieut. J. P. Smith is dismissed the Service, His Majesty having no further occasion for his services; March 6.

The notification in *Gazette* of April 8 concerning Sec. Lieut. V. T. Lloyd-Davis is cancelled.

The initials of W. J. Wreford are as now described, and not as stated in *Gazette* of March 18.

The notification in *Gazette* of Nov. 22, 1918, concerning Lieut. (actg. Capt.) J. F. Byrom is cancelled.

Technical Branch

Lieut. (actg. Capt.) G. A. Heath relinquishes the actg. rank of Capt., Grade (B) on ceasing to be employed as Capt.; April 23.

Lieut. W. Bourne to be graded for pay as Lieut., Grade (B); March 20.

Sec. Lieut. R. R. Crosby to be Lieut., with pay and allowances of that rank; Feb. 28. (Substituted for notification in *Gazette* Feb. 28.)

Sec. Lieuts. to be Lieuts., without pay and allowances of that rank:—C. C. Duffield; April 2, 1918. (Substituted for notification in *Gazette*, March 7.) (Hon. Lieut.) H. J. Gilbert; April 3, 1918. H. C. Baker; March 1.

Maj. S. J. Lacey, O.B.E. (Lieut.-Comdr., R.N.) relinquishes his commn. on ceasing to be employed; March 20.

(Then follow the names of 52 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. (Hon. Lieut.) A. Dobner relinquishes his commn. on account of ill-health; May 7.

The date Lieut. E. H. Fitchew relinquishes his commn. is July 28, 1918, and not as stated in *Gazette* of July 30, 1918.

The Christian names and surname of Sec. Lieut. Andrew John Brown are as now described, and not A. J. Brown, M.C., as stated in *Gazette* of April 8.

The notification in *Gazette* of Sept. 17, 1918, concerning Lieut. B. B. Lemon is cancelled.

Medical Branch

Transferred to Unemployed List:—Lieut. L. E. Stamm; Feb. 21. Capt. J. B. Stevenson; Feb. 25. Maj. A. H. Hogarth; April 23.

Maj. A. Paling relinquishes his commn. on account of ill-health; May 5.

Chaplains' Branch

Assistant Principal Chaplain for Wesleys :—Rev. A. S. Bishop (Chaplain, 4th Class, A.C.D.) is granted a temp. commn. as Chaplain, with the relative rank of Capt., and is granted the relative rank of Maj. whilst employed as Assistant Principal Chaplain; Jan. 1.

Transferred to Unemployed List:—Col. the Rev. W. J. Selby, M.A.; April 4. Capt. J. H. Bentley; April 12.

Memoranda

(Then follow the names of 459 Overseas Cadets who are granted temp. commns. as Sec. Lieuts.)

Temp. Hon. Lieut. F. Read relinquishes his commn. on ceasing to be employed; March 16.

The following are transferred to Unemployed List:—Lieut. (actg. Capt.) P. H. Barr, from (S.O.); March 28. Lieut. (Hon. Capt.) (actg. Capt.) W. T. Taylor, from (S.O.); April 2. Capt. (actg. Maj.) F. H. Tyas, from (S.O.); April 14. Capt. F. C. Hogarth, from (S.O.); April 15. Lieut. (actg. Capt.) L. S. Kiggell, from (S.O.); April 16. Maj. J. Rubie, O.B.E., from (S.O.); April 18. Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) J. F. Lewis, from (S.O.); April 25. Lieut. (actg. Capt.) E. E. Colquhoun, M.B.E., from (S.O.); Capt. (actg. Maj.) R. D. Law (W. Yorks R.), from (S.O.); April 30.

Lieut.-Col. I. A. E. Edwards, C.M.G., resigns his commn., and is permitted to retain his rank; May 7.

London Gazette, May 9

The following temporary appointments are made:—

Group Commander.—Lieut.-Col. A. M. Longmore, D.S.O., and to be actg. Col. while so employed, vice Lieut.-Col. C. F. de S. Murphy; May 5.

Staff Officer, 2nd Class.—(Q)—Capt. O. H. Frost, M.C.; May 1.

Flying Branch

Lieut.-Col. C. R. Finch-Noyes, D.S.O., A.F.C., to be Lieut.-Col. (A. and S.), from (S.O.); March 5 to April 30.

Maj. (actg. Lieut.-Col.) E. H. M. O'Farrell to be Maj. (A.), and relinquishes the actg. rank of Lieut.-Col. on reduction of establishment; April 13.

Capt. T. Q. Studd, D.F.C., to be actg. Maj. whilst employed as Maj. (A.); Oct. 24, 1918, to April 30.

Capt. to be actg. Majs. whilst employed as Majs. (A'ship):—W. K. F. G. Warneford, from June 17, 1918, to Jan. 31. A. H. Wann, from Nov. 17, 1918, to April 30.

The following Capts. (actg. Majs.) relinquish the actg. rank of Maj. on reduction of establishment:—M. S. Marsden (A.), H. J. Segrave (A.), S. St. G. C. Belfield (K.B.); April 13.

Lieuts. to be actg. Capts. whilst employed as Capts.:—C. G. Wigglesworth, A.F.C. (A'ship); Aug. 1, 1918, to Jan. 31. J. H. Bentham (A. and S.); June 1, 1918, to Nov. 11, 1918.

The following Lieuts. (actg. Capts.) (A.) relinquish the actg. rank of Capt. on reduction of establishment:—E. J. A. Burke, A. L. Chick, A.F.C., J. S. Chick, M.C., J. M. Glaisher, D.F.C., G. V. Howard, R. E. Heath, L. H. Jones, F. S. McClurg, R. J. Rodwell, G. H. Russell, D.F.C., R. N. Swann, W. S. C. Smith, F. B. Wilson; April 13.

Sec. Lieut. H. Lloyd-Williams to be Lieut.; Sept. 28, 1918.

Sec. Lieut. A. C. T. Isaac (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (A.); Sept. 1, 1918.

Sec. Lieut. W. W. J. Debenham (late Gen. List, R.F.C., on prob.) is confirmed in his rank of Sec. Lieut. (A.); Sept. 27, 1918.

J. Morton, A.F.C. (Temp. Sec. Lieut., K.R. Rif.) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 1, 1918.

P.F.O. J. G. Stitt (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); Nov. 10, 1918.

Flt. Cadet W. Davies is granted a temp. commn. as Sec. Lieut. (O.); Nov. 3, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. A. C. Campbell; June 15, 1918. Lieut. A. L. A. Kane (Lieut., Nova Scotia R.); Dec. 16, 1918. Lieut. (Hon. Capt.) N. McL. Sanders (Capt. Can. A.S.C.); Jan. 23. Sec. Lieut. (Hon. Capt.) C. C. Gilbert (Capt., N. Zealand Otago R.); Feb. 10. Maj. F. H. M. Codville, M.C. (Maj., R. Can. Dragoons); March 2. Sec. Lieut. J. Rudkin, M.C. (Sec. Lieut., R.W. Surr. R.); March 31. Capt. P. G. Bateman (Capt., Lond. R.); April 9. Lieut. J. D. Barnes (Lieut., Dur. L.I., T.F.); April 12. Lieut. G. F. Bell (Lieut., Yorks R., T.F.); April 14.

(Then follow the names of 265 officers who are transfd. to the Unemployed List. We regret that owing to great pressure on our space, it is impossible to reprint this portion of the List.—ED.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—C. H. Dunster (contracted on active service); April 24. F. E. Robinson (contracted on active service); April 4 (substituted for notification in the *Gazette* of Jan. 17). F. Green (substituted for notification in the *Gazette* of Dec. 6, 1918). J. A. Harkin (substituted for notification in the *Gazette* of Feb. 25); May 9.

Lieut. J. N. Raby resigns his commn.; May 9.

Sec. Lieut. F. T. Molland relinquishes his commn. on account of ill-health; May 10 (substituted for notification in the *Gazette* of Jan. 14).

Lieut. R. J. Stallard to take rank and prec. as if his appointment as Lieut. bore date Oct. 1, 1918.

The following Sec. Lieuts. are dismissed the Service:—J. N. MacDonald, for absence without leave; Dec. 2, 1918. J. B. Wickham; April 16.

G. A. Thompson is antedated in his appointment as Sec. Lieut. (A.); Aug. 27, 1918.

The appointment of Sec. Lieut. R. C. Van Der Ben, M.C., is antedated to Sept. 2, 1918.

The surname of Sec. Lieut. C. Walter is as now described, and not as stated in *London Gazette* of June 14, 1918.

The notification in the *Gazette* of Feb. 25 concerning Lieut. H. G. Smith (Nova Scotia R.) is cancelled.

The notification in the *Gazette* of March 4 concerning Sec. Lieut. R. Clark is cancelled.

Administrative Branch

Lieut. (Hon. Capt.) (actg. Capt.) C. H. Lewis to be actg. Maj. whilst employed as Maj. from Jan. 12 to April 30.

Capt. S. M. Wood to be Capt., from (S.O.); May 1.

Lieut. E. Winter to be actg. Capt. whilst employed as Capt. from Oct. 18, 1918, to April 30.

Lieut. (Hon. Capt.) (actg. Capt.) G. Chetwynd-Stapylton relinquishes the actg. rank of Capt. on reduction of establishment; April 13.

K. E. Clayton (Temp. Capt., Somerset L.I.), is granted a temp. commn. as Lieut.; Aug. 10, 1918, and to be hon. Capt., with seniority from April 1, 1918.

Lieut. (actg. Capt.) A. A. Denison, M.B.E., M.C., to be Lieut., and relinquishes the actg. rank of Capt. on ceasing to be employed as Capt. (A.); April 17.

Lieuts. (A.) to be Lieuts.:—C. L. De Beer, L. Duffus, H. Hammond, M.C., J. McM. McLennan, D.F.C., F. F. Morris, G. D. Rowden, E. S. C. Sen, G. M. Smith, A. D. Whitehead; April 17.

H. D. Evans; April 24.

Lieut. W. E. Wright to be Lieut. from (K.B.); April 17.

Lieuts. (O.) to be Lieuts.:—N. T. Berrington, J. M. Brisbane, M.C., W. M. E. Chester, M.C.; April 17.

Sec. Lieut. H. J. Young to be Lieut.; Dec. 21, 1918.

Sec. Lieut. (hon. Capt.) C. J. P. Copner to be actg. Lieut. whilst employed as Lieut., from (K.B.), from July 29, 1918, to April 30 (substituted for notification in *Gazette* of Dec. 31, 1918).

Sec. Lieut. S. H. Coronel to be actg. Lieut. whilst specially employed from April 29 to April 30.

Sec. Lieut. T. H. Hesketh to be Sec. Lieut. from (A.); April 17.

Sec. Lieut. H. H. Ffrench to be Sec. Lieut. from (O.); April 17.

A. Buckley is granted a temp. commn. as Sec. Lieut.; (April 30, 1918).

The following Lieuts. relinquish their commns. on ceasing to be employed:—Capt. F. C. Barrett (Fife and Forfar Yeo.); Feb. 25. Lieut. J. P. D. Mostyn (Lieut., R. Suss. R.); March 6. Lieut. F. H. Ward (W. Yorks R., T.F.); March 7. Lieut. R. St. J. Hartley (Devon R.); March 12. Lieut. J. E. S. P. Bradford, M.C. (W. Rid. R.); April 19. Lieut. W. A. Waterman (Border R.); April 24.

(Then follow the names of 44 officers who are transfd. to the Unemployed List.)

Sec. Lieut. C. E. Goodrum relinquishes his commn. on account of ill-health contracted on active service; Nov. 1, 1918 (substituted for notification in *Gazette*; Jan. 21).

Sec. Lieut. J. R. McCormack is removed the Service, his Majesty having no further occasion for his services as an officer; Feb. 28.

Sec. Lieut. S. G. Coates is removed the Service for absence without leave; Sept. 13, 1918.

The notification in the *Gazette* of April 11 concerning Lieut. (actg. Capt.) D. H. Robertson, A.F.C., is cancelled.

The notification in the *Gazette* of April 8 concerning Sec. Lieut. S. D. Good is cancelled.

Technical Branch

Maj. (actg. Lieut.-Col.) C. Barber to be Maj., and relinquishes the actg. rank of Lieut.-Col.; March 20.

Maj. C. Barber to be graded for purposes of pay and allowances of Lieut.-Col., Grade (B.); April 22.

Lieut. (actg. Capt.) H. A. Braddock to be graded for pay and allowances of Capt. whilst employed as Capt., Grade (A); April 1.

Lieut. L. F. de Peyrecave to be actg. Capt. whilst specially employed at the Ministry of Munitions from Aug. 17, 1918 to April 30.

Lieut. W. J. Bunting to be actg. Capt. whilst employed as Capt., Grade (B), from Nov. 1, 1918, to April 30.

Sec. Lieut. (hon. Lieut.) A. Ward to be actg. Capt. whilst specially employed at the Ministry of Munitions from Aug. 25, 1918, to April 30.

Sec. Lieut. B. H. Sagar to be actg. Capt. whilst holding a special appointment at the Ministry of Munitions from Dec. 1, 1918, to April 30.

Sec. Lieut. (actg. Capt.) S. K. D'A. Ferrars to be Lieut.; April 5, 1918.

Sec. Lieuts. to be Lieuts. without pay and allowances of that rank:—(Hon. Lieut.) R. V. Weekes; May 23, 1918. C. B. Stamp; Oct. 13, 1918.

Sec. Lieut. H. G. Murphy to be actg. Lieut. while employed as Lieut., Grade (B.), from Dec. 3, 1918, to April 30.

Sec. Lieuts. to be Sec. Lieuts. (Grade A), from (A.O.):—H. D. Olson; Nov. 26, 1918 (substituted for notification in the *Gazette* of Dec. 13, 1918). P. F. Jessop; Jan. 1. A. E. Chester; Feb. 21.

Sec. Lieuts. to be Sec. Lieuts., Grade (B.), from (A.O.):—A. N. Ramsey; Jan. 16. J. G. Smithson; April 29.

Sec. Lieut. E. G. Grafton (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut., Grade (B); Feb. 18.
(Then follow the names of 49 officers who are transfd. to the Unemployed List.)

Sec. Lieut. W. N. Edwards to take rank and prec. as if his appointment as Sec. Lieut. bore date Oct. 1, 1918.

Sec. Lieut. C. W. O'Brien resigns his commn.; May 10.

The notification in *Gazette* Feb. 25 concerning Sec. Lieut. P. H. C. Martin is cancelled.

Medical Branch

E. L. Sergeant is granted a temp. commn. as Lieut.; May 8.
Transferred to Unemployed List.—Capt. M. R. O. Wilson; April 6. Capt. (actg. Maj.) A. Scott-Turner; April 8. Lieut. G. M. Wishart; April 16. Lieut. B. R. B. Truman, I. M. Thomson; April 17. Capt. S. Robertson; April 25.

Dental Branch

Lieut. V. E. Mills is transfd. to the Unemployed List; April 17.

Memoranda.

All officers of the Royal Air Force holding actg. rank relinquish such rank with effect from May 1 and revert to their substantive ranks as shown in the Monthly Air Force List, with the exception of officers belonging to the forces engaged in operations in Russia, the undermentioned officers who will hold the actg. rank stated against their names and other officers who may hereafter be gazetted.

To be acting Brigadier-Generals.—Co. A. V. Vyvyan, C.B., D.S.O., whilst employed as an Area Comdr.; Col. P. W. Game, C.B., D.S.O., whilst employed as a Director; Col. O. Swann, C.B., whilst holding an independent command; Col. B. H. H. Cooke, C.M.G., D.S.O., whilst officiating as an Area Comdr.; Col. H. R. M. Brooke-Popham, C.M.G., D.S.O., A.F.C., whilst employed as a Director; Col. E. Maitland, C.M.G., D.S.O., whilst specially employed; Col. C. L. Lambe, C.M.G., D.S.O., whilst employed as a Director; Col. J. M. Steel, C.B.E., whilst employed as a Brig.-Genl., Air Staff; Col. C. A. H. Longcroft, C.M.G., D.S.O., A.F.C., whilst employed as an Area Comdr.; Col. T. I. Webb-Bowen, C.M.G., whilst employed as an Area Comdr.; Col. L. E. O. Charlton, C.B., C.M.G., D.S.O., whilst employed as an Air Attaché; Col. R. M. Groves, C.B., D.S.O., A.F.C., whilst employed as Deputy Chief of the Air Staff; Col. J. H. W. Becke, C.M.G., D.S.O., whilst employed as a Brig. Comdr.; Col. R. E. T. Hogg, C.M.G., C.I.E., whilst employed as a Brig. Comdr.; Col. E. L. Gerrard, C.M.G., D.S.O., whilst holding an independent command; Col. M. H. G. Fell, C.B., C.M.G., whilst employed as a Director; Col. P. R. C. Groves, D.S.O., whilst specially employed; Lieut.-Col. R. K. Bagnall-Wild, C.M.G., whilst employed as a Director; Lieut.-Col. P. L. W. Herbert, C.M.G., whilst officiating in command of the R.A.F. in the Middle East; Lieut.-Col. N. D. K. MacEwen, C.M.G., D.S.O., whilst holding an independent command; Lieut.-Col. C. C. Marindin, D.S.O., whilst employed as a Director.

To retain relative rank of Brigadier-General:—Rev. H. D. L. Viener, M.A. while employed as a Chaplain-in-Chief.

To be acting Colonels:—Lieut.-Col. R. C. S. Hunt; Lieut.-Col. C. R. Samson, D.S.O., A.F.C.; Lieut.-Col. R. H. Clark-Hall, D.S.O.; Lieut.-Col. R. D. S. Stoney, C.B.E., while employed at the Central Pay Office; Lieut.-Col. A. M. Longmore, D.S.O.; Lieut.-Col. A. W. C. McFall, while employed as permanent President of Courts-Martial; Lieut.-Col. F. H. G. Playfair, while employed as permanent President of Courts-Martial; Lieut.-Col. I. Curtis; Lieut.-Col. A. V. Bettington, C.M.G., while specially employed; Maj. W. P. Alexander, while employed as permanent President of Courts-Martial; Maj. H. C. Ellis, C.B.E., while in charge of the Gen. Services Pay Office.

To retain the relative rank of Colonel:—Rev. R. E. V. Hanson, M.A., while

employed as Deputy Chaplain-in-Chief; Rev. S. L. Clarke, M.A., B.Sc., while employed as Deputy Chaplain-in-Chief; Rev. S. J. Jones, M.C., while employed as Principal Chaplain; Rev. J. Dey, D.S.O., while employed as Principal Chaplain; Rev. R. Hall, while employed as Principal Chaplain; Rev. W. Moffat, while employed as Principal Chaplain.

To be acting Lieutenant-Colonels.—Maj. E. R. Peal, O.B.E., D.S.C., while specially employed; Maj. W. D. S. Sanday, D.S.O., M.C., while employed as an Air Attaché; Maj. E. R. C. Nanson, D.S.O., A.F.C., while commanding a Group; Maj. H. A. Moore, C.B.E., M.C., while employed as Staff Officer, 1st Class; Maj. Sir N. R. A. D. Leslie, Bt., C.B.E., while employed as an Air Attaché; Maj. D. Mackenzie, while employed as Permanent President of Courts-Martial; Maj. H. B. Bonning, while employed as Officer in Charge of Records; Maj. S. J. Goble, D.S.O., O.B.E., D.S.C., while specially employed; Maj. D. Harries, A.F.C., while specially employed; Maj. H. C. T. Langdon, while employed as Principal Medical Officer of an Area; Capt. E. S. Halford, O.B.E., while specially employed.

To be acting Majors:—Capt. C. L. Bullock, O.B.E., while specially employed; Capt. G. F. Clark, while employed as Area Representative on Quartering Committees; Capt. A. S. C. Maclare, M.C., A.F.C., while specially employed; Capt. R. F. S. Leslie, D.S.C., D.F.C., whilst specially employed; Capt. D. C. James, whilst specially employed; Capt. W. J. King, D.C.M., whilst employed as Area Representative on Quartering Committees; Lieut. W. H. Holroyd, whilst employed at the Central Pay Office; Lieut. D. G. Northam, whilst employed as Area Representative on Quartering Committees; Lieut. C. J. Brockbank, whilst employed at R.A.F. Record Office; Sec. Lieut. A. R. Fulton, whilst specially employed.

To be acting Captains:—Lieut. G. F. Ansell, whilst employed at the Central Pay Office; Lieut. W. H. Lyall, M.B.E., whilst employed at the Central Pay Office; Sec. Lieut. C. T. Johnson, whilst employed at the Central Pay Office; Sec. Lieut. A. E. M. Fortescue, M.B.E., whilst employed at the Genl. Services Pay Office; Sec. Lieut. E. S. Peters, whilst employed at the Genl. Services Pay Offices; Sec. Lieut. I. Wardle, whilst employed at the Central Pay Office; Sec. Lieut. S. W. Hodgkinson, whilst employed at the Genl. Services Pay Offices; Lieut. R. C. Vaughan, M.C., whilst employed as Courts-Martial Officer; Lieut. G. Norrington, whilst employed as Courts-Martial Officer; Lieut. M. J. Norton, whilst employed as Courts-Martial Officer; Lieut. A. B. Langridge, whilst employed as Courts-Martial Officer; Lieut. E. S. C. Brooks, whilst employed as Courts-Martial Officer; Sec. Lieut. J. H. Slingsby, whilst employed as Courts-Martial Officer; Sec. Lieut. G. T. Armitage, whilst employed as Courts-Martial Officer; Sec. Lieut. J. E. B. Cochrane, whilst employed as Courts-Martial Officer.

To be acting Lieutenant.—Sec. Lieut. W. F. Swan, whilst employed at the Central Pay Office; Sec. Lieut. F. T. L. Avis, whilst employed at the Central Pay Office; Sec. Lieut. F. C. Bird, whilst employed at the Central Pay Office; Sec. Lieut. E. G. Boone, whilst employed at the Central Pay Office; Sec. Lieut. W. G. Chate, whilst employed at the Central Pay Office; Sec. Lieut. F. W. Healey, whilst employed at the Central Pay Office; Sec. Lieut. L. J. Marden, whilst employed at the Central Pay Office; Sec. Lieut. J. L. Saxton, whilst employed at the Central Pay Office; Sec. Lieut. H. Ball, whilst employed at the Central Pay Office; Sec. Lieut. S. J. Croad, whilst employed at the Central Pay Office.

(Then follow the names of 248 Overseas Cadets who are granted temp. commns as Sec. Lieuts.)

Temp. Hon. Capt. H. Longton relinquishes his commn. on ceasing to be employed; April 16.

(Then follow the names of 18 officers who are transfd. to the Unemployed List.)

Capt. (Hon. Maj.) W. G. M. Sarel (Rif. Bde.), from (S.O.), relinquishes his commn. on account of ill-health; May 7.

Lieut. J. More resigns his commn.; May 10.

SIDE-WINDS

taken to ensure that the excellence of Britannia dope and varnishes is maintained.

MESSRS. BOULTON AND PAUL, of Norwich, were among the first to make use of aircraft for commercial purposes in connection with their business as contractors and engineers, which was established over a hundred years ago. The trip in question was made before noon on May 1, and resulted in a good business deal. It appears that a Bury St. Edmund's firm was negotiating a contract for the extension of their premises which involved a large constructional engineering order and wished to consult a representative of Boulton and Paul. The sales manager had his time closely filled with numerous appointments and business, and although the journey from Norwich is a short one it would have consumed the greater part of a business day to go to and fro and carry out the discussion. A Boulton and Paul "P. 6" two-seater machine was called into service, the sales manager was embarked, and in 20 minutes was landed at Bury St. Edmund's. The machine used is one which Boulton and Paul have adopted as the cheapest and most convenient for just such trips as the one instanced. It is fitted with a 90 h.p. R.A.F. engine, has a speed of over 100 miles per hour and carries fuel for a 300-mile flight. Its sound construction and stability were proved by this journey in bad weather, and these points, and the extraordinarily low selling price of £600 all go to emphasise the suitability of the craft for such purposes.

RELATIVES and others who wish to perpetuate the memory of flying officers who have given their lives in the War, by the erection of a bronze tablet or a piece of sculpture, may be recommended to communicate with Messrs. Young and Co., of 6, Queen Anne's Gate, Westminster, S.W. This firm are not only specialising in this type of work, but they are able to furnish artistic and original designs.

RESETTLEMENT

THERE are many officers and men of the R.A.F. who are demobilised or about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, FLIGHT, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

T. R. H., EX-FLIGHT CADET.—We think the best course to pursue in your case is to (1) remain in your present post; (2) take a degree course (evening) in mechanical engineering at a local polytechnic; (3) study standard aeronautical books and journals; (4) join the Royal Aeronautical Society; (5) spend your vacation, if possible, in aircraft works. By the time you have obtained the necessary qualifications there will certainly be good openings in commercial aviation in the capacity you suggest.

J. A. H., EX-FLIGHT SERGT.—You will be best advised to remain in your present post and await developments in commercial aviation. Judging from your Service experience only (as you have not stated your civil qualifications) we think that the kind of post in civil aviation which you have a reasonable chance of obtaining is that of "ground engineer (engines)." If you decide on this you should take the necessary steps to secure a licence. See Section IV, Supplementary Air Regulations, Air Navigation Regulations, reproduced in FLIGHT, May 8, 1919.

L. G. R. (Engines).—In view of the large number of highly skilled mechanics available, and also the limited number required for civilian aviation, we fear that with your present lack of "works experience" there is little chance of your obtaining employment in commercial aviation as an engine mechanic. See also reply to J. A. H., Ex-Flight Sergt. above.

A. J. H., EX-CORPORAL.—You may experience great difficulty in securing civilian employment of a similar nature to your Service work. Possibly Messrs. Vickers, Ltd., Basil Street, Knightsbridge, S.W. 3, may have vacancies for hydrogen workers.

NEW COMPANIES REGISTERED

CAPAC CO., LTD., 2, Woodstock Street, Hanover Square, W.—Capital £5,000, in £1 shares. Manufacturers of and dealers in airships, aeroplanes and aircraft of all kinds, motor cars, etc. Governing director: G. Richards.

CLIFFE INDUSTRIALS, LTD., 1, Garthorne Road, Honor Oak Park, S.E. 23.—Capital £500, in £1 shares. Manufacturers of motors, etc. First directors: G. Dunsmore, R. Dunsmore.

KENT-YORKS ENGINEERING CO., LTD.—Capital £2,000, in £1 shares. Manufacturers of motor cars, etc. First directors: S. C. J. Bruse, F. Thompson and R. G. Batey. Solicitors: Letts Brothers, 8, Bartletts Buildings, E.C. 4.

LION ENGINEERING CO. (BIRMINGHAM), LTD., 16-17, Murdoch Chambers, Corporation Street, Birmingham.—Capital £5,000, in £10 shares. Acquiring the Lion Engineering Co., carried on at Monastery Buildings, Upper Priory, Birmingham, manufacturers of components and parts of aeroplanes and motor cars, etc. Permanent managing director, L. Spares.

MECHANICAL STARTER SYNDICATE, LTD., 175, Piccadilly, W.—Capital £5,000, in £1 shares. Proprietors of self starters for motor cars, aeroplanes, etc., under agreements with E. W. Lewis and C. Leese.

IMPORTS AND EXPORTS, 1918-1919.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; and for 1918, see "FLIGHT" for January 16, 1919.

| Imports. | | Exports. | | Re-exportation. | |
|--------------|---------|-----------|--------|-----------------|-----------|
| 1918. | 1919. | 1918. | 1919. | 1918. | 1919. |
| £ | £ | £ | £ | £ | £ |
| January ... | 49,402 | 555,989 | 24,765 | 57,571 | — |
| February ... | 51,941 | 453,822 | 13,545 | 57,972 | — |
| March ... | 47,930 | 704,424 | 11,451 | 72,716 | 1,000 400 |
| April ... | 33,342 | 97,662 | 10,815 | 25,433 | — |
| | 182,615 | 1,811,897 | 60,576 | 213,692 | 1,000 400 |

Aeronautical Specifications Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 15, 1919

9,095. S. A. FLOWER. Airships. (125,398.)
9,481. E. B. MAXTED. Manufacture of hydrogen. (125,410.)
9,622. A. V. ROE. Detachable blade propellers. (125,419.)
9,851. J. A. PETERS. Braking arrangements for aeroplanes. (125,424.)
10,120. M. F. SUETER. Aircraft. (125,429.)
10,192. S. R. PARKES. Bombs for use with aircraft. (125,432.)
10,461. R. F. POWER. Aerial observation. (125,438.)
10,893. H. R. RICARDO. I.C. engines. (125,448.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 15, 1919

6,436. C. BAYNES. Controlling devices for aircraft engines. (125,504.)
8,914. J. ELLIS. Inclinometers. (125,530.)
11,148. D. J. MOONEY. Treating steel for aircraft. (125,544.)
15,977. W. R. D. SHAW. Aerofoils. (125,559.)
19,151. A. M. LOW. Apparatus for testing aeroplanes. (125,564.)
19,582. SOC. DES MOTEURS SALMSON (CANTON UNNE). Junction piece for connecting structural members of aeroplane. (121,466.)
19,583. SOC. DES MOTEURS SALMSON (CANTON UNNE). Metal fitting for horizontal rudder of aircraft. (121,467.)
21,876. C. F. WESTBURY. Tail skids. (125,570.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications are printed and abridged, etc.

Published May 8, 1919

7,395. VICKERS, LTD., and T. S. DUNCAN. Mountings for guns on aircraft. (125,114.)
7,467. A. F. MALDER. Packing case for transport of aircraft. (125,115.)
7,478. SUNBEAM MOTOR CAR CO. and L. COATALEN. Cooling of I.C. engines for aircraft. (125,116.)
7,587. BARR AND STROUD, A. BARR and W. STROUD. Instruments for anti-aircraft gunnery. (125,121.)
7,738. DUNLOP RUBBER CO. and C. MACBETH. Aeroplane wheel device. (125,123.)
7,819. W. N. EDWARDS and J. D. GARDNER. Sight for bomb dropping. (125,124.)
7,822. BLACKBURN AEROPLANE AND MOTOR CO. and R. BLACKBURN. Aeroplanes. (125,125.)
7,840. SIR W. G. ARMSTRONG, WHITWORTH AND CO., LTD., and G. FORSTER. Non-recoiling guns for aircraft. (125,126.)
8,610. J. A. PETERS. Aeroplanes. (125,152.)
8,738. S. E. SAUNDERS. Seaplanes. (125,159.)
8,877. A. F. NALDER. Portable hangar of aeroplane shed. (125,162.)
8,943. L. ROTTENBURG and P. W. WILLANS. Height-finder for use with anti-aircraft guns. (125,164.)

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The 8-page Index for Vol. X of "FLIGHT" (January to December, 1918) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 8d. per copy, post free.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlvii, xlviii, xlvi, and 1).

NOTICE TO ADVERTISERS

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

and The Aircraft Engineer.

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
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Telephone: Gerrard 1828.

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Should any difficulty be experienced in procuring "FLIGHT" from local newsagents, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.